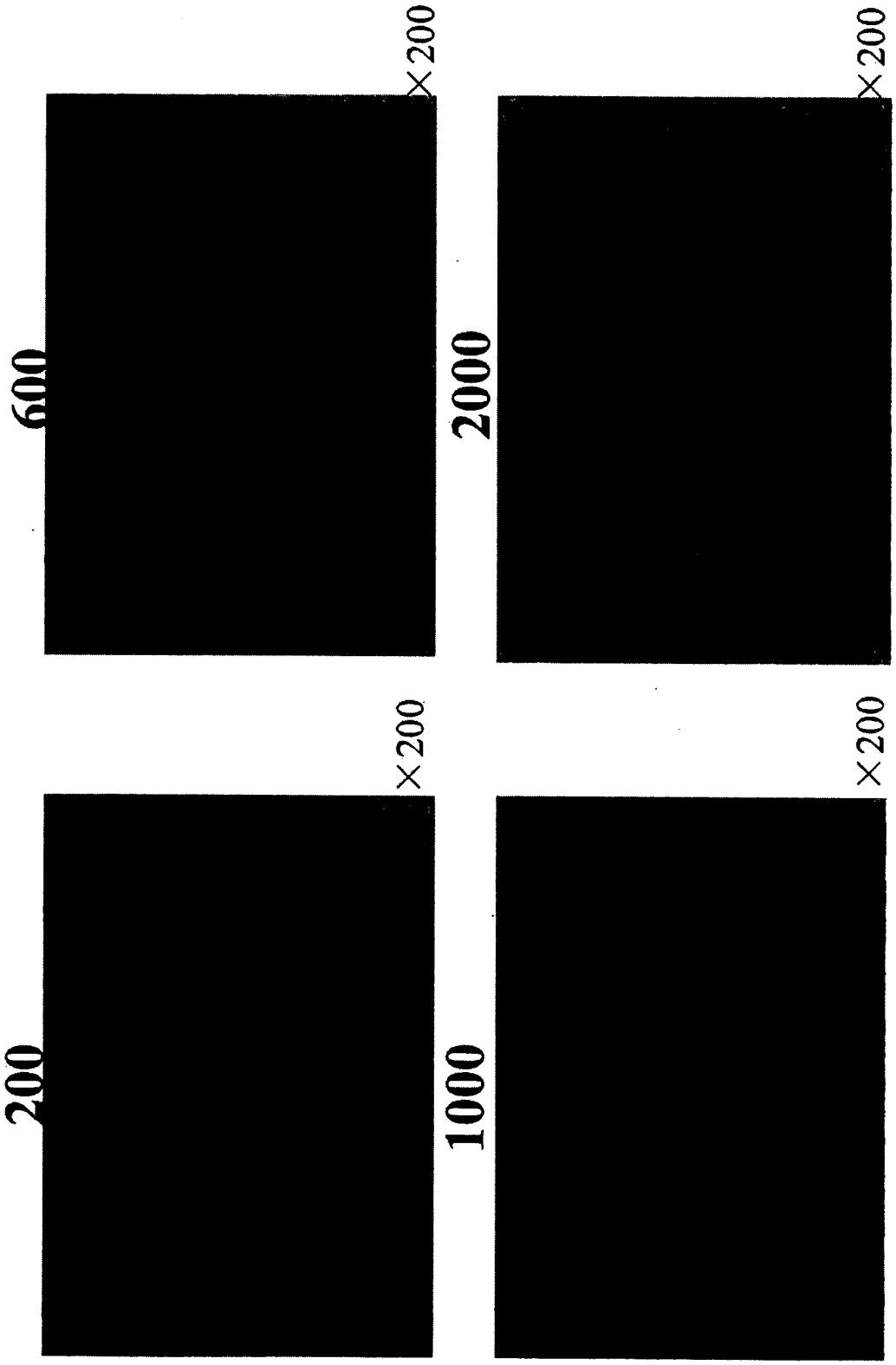
Fig. 1



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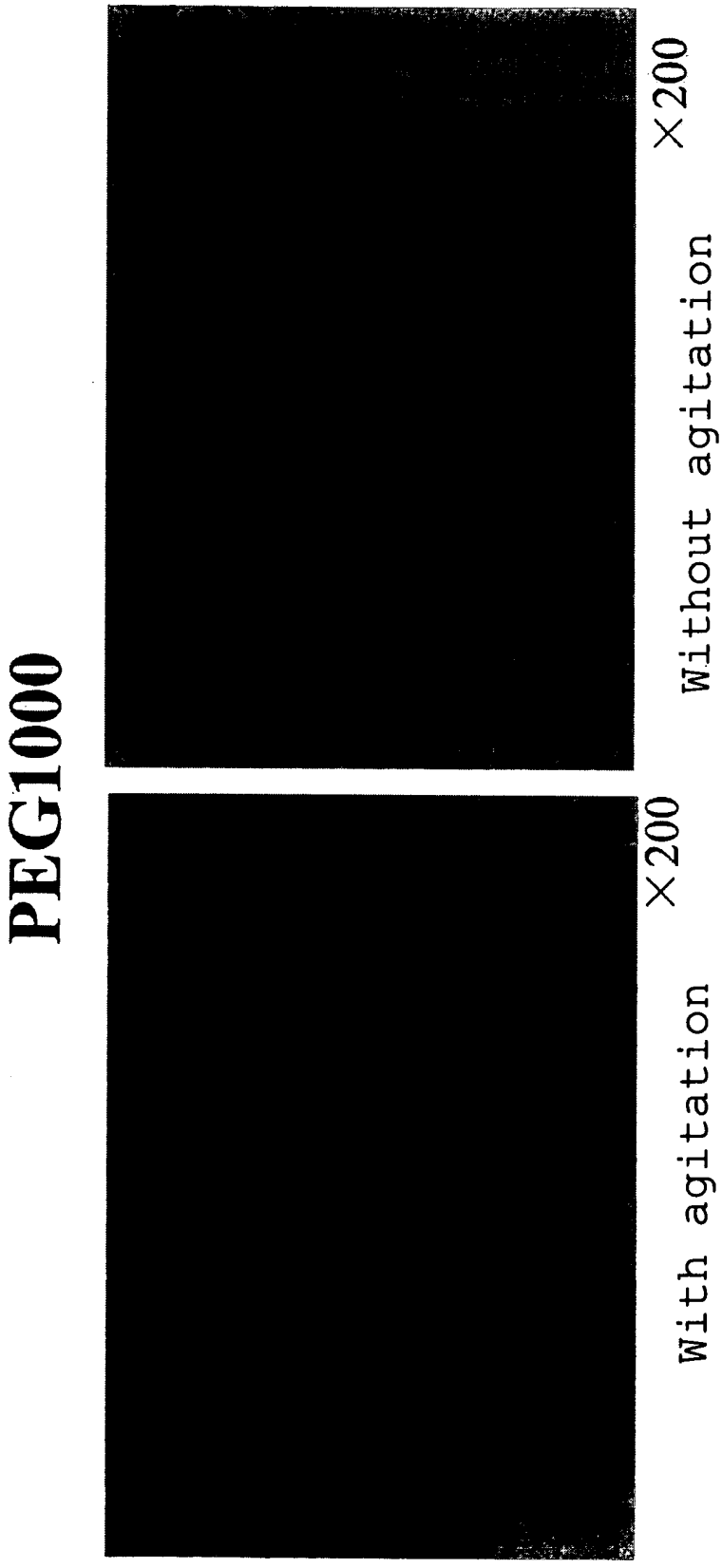

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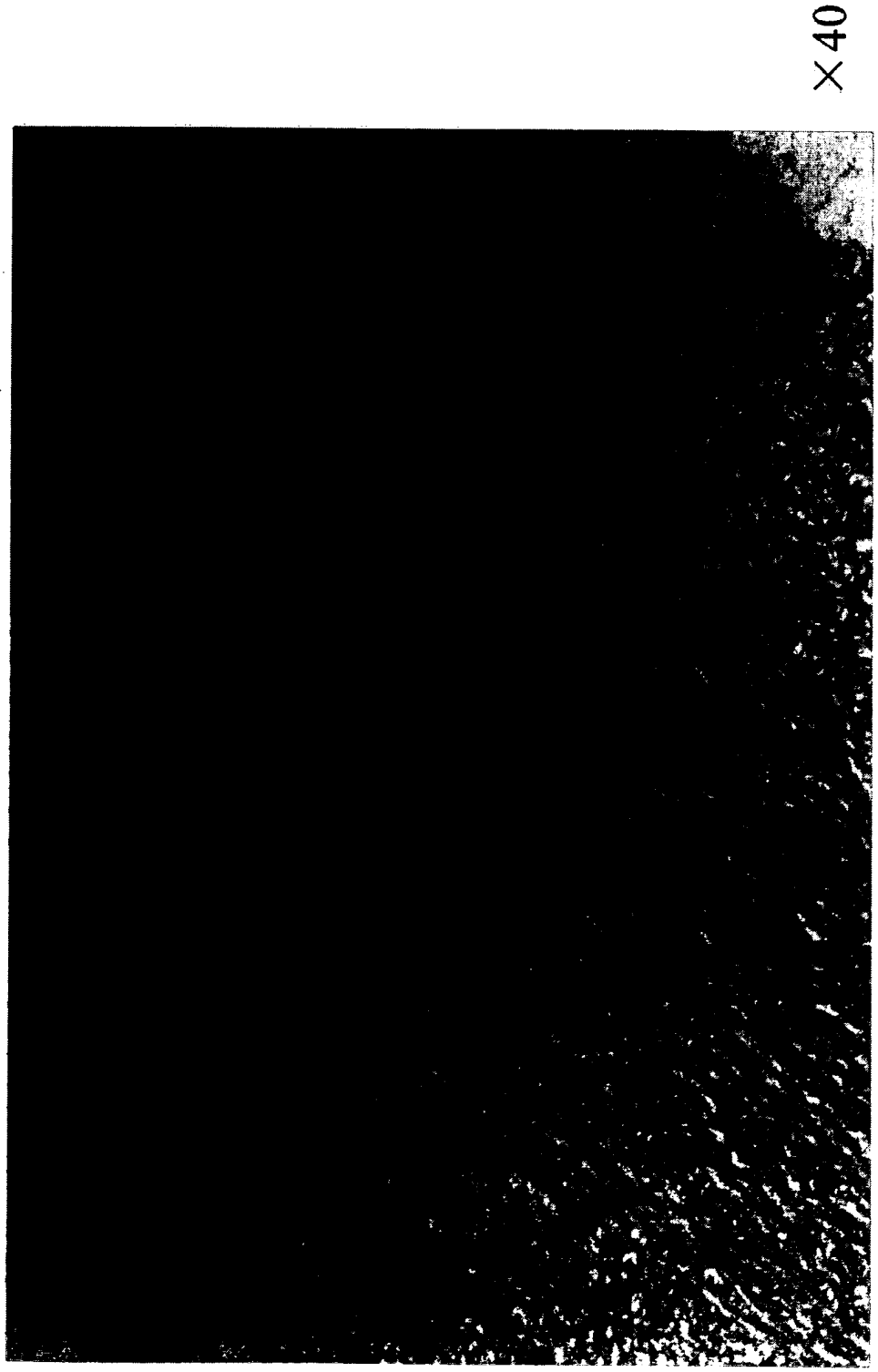

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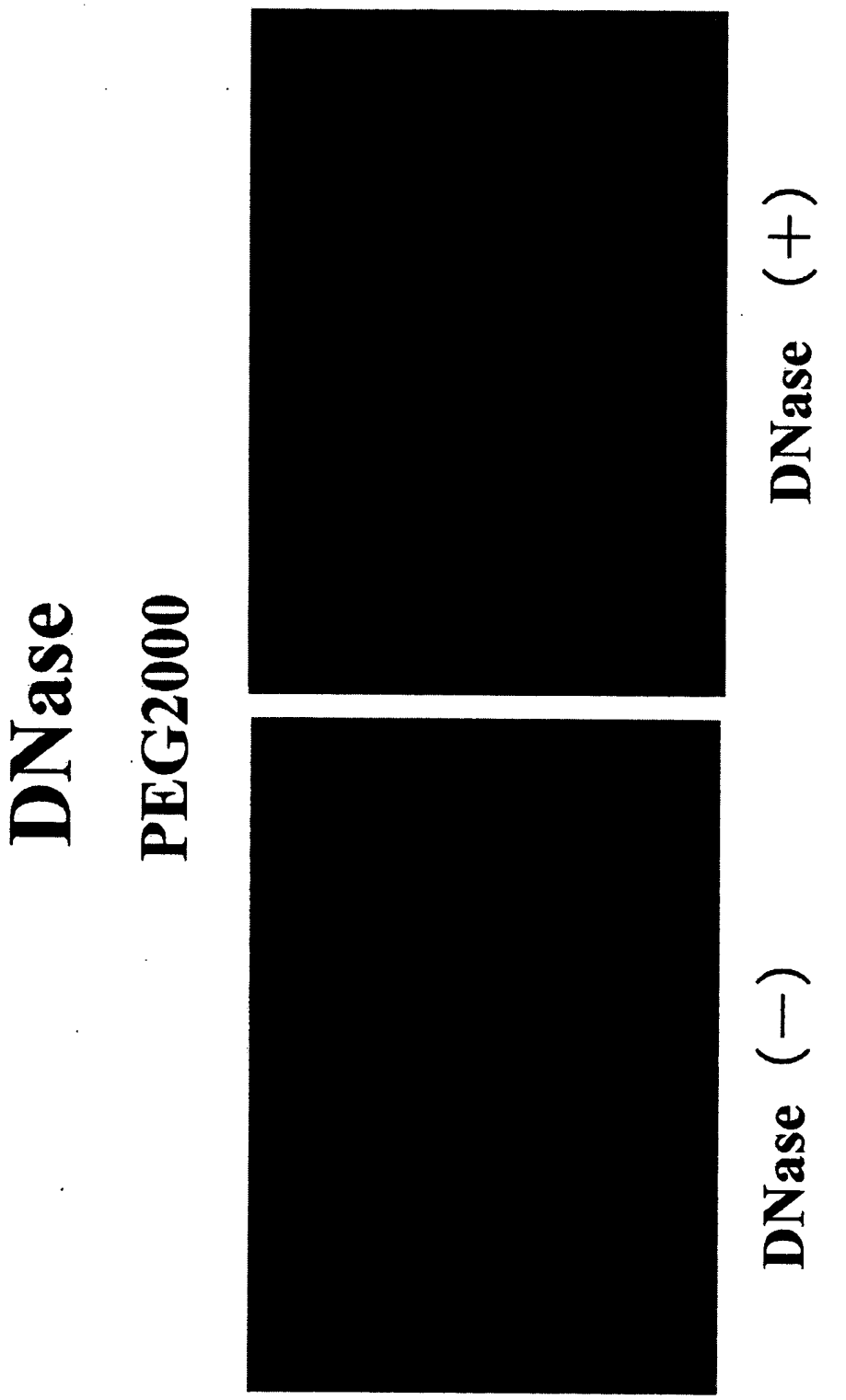

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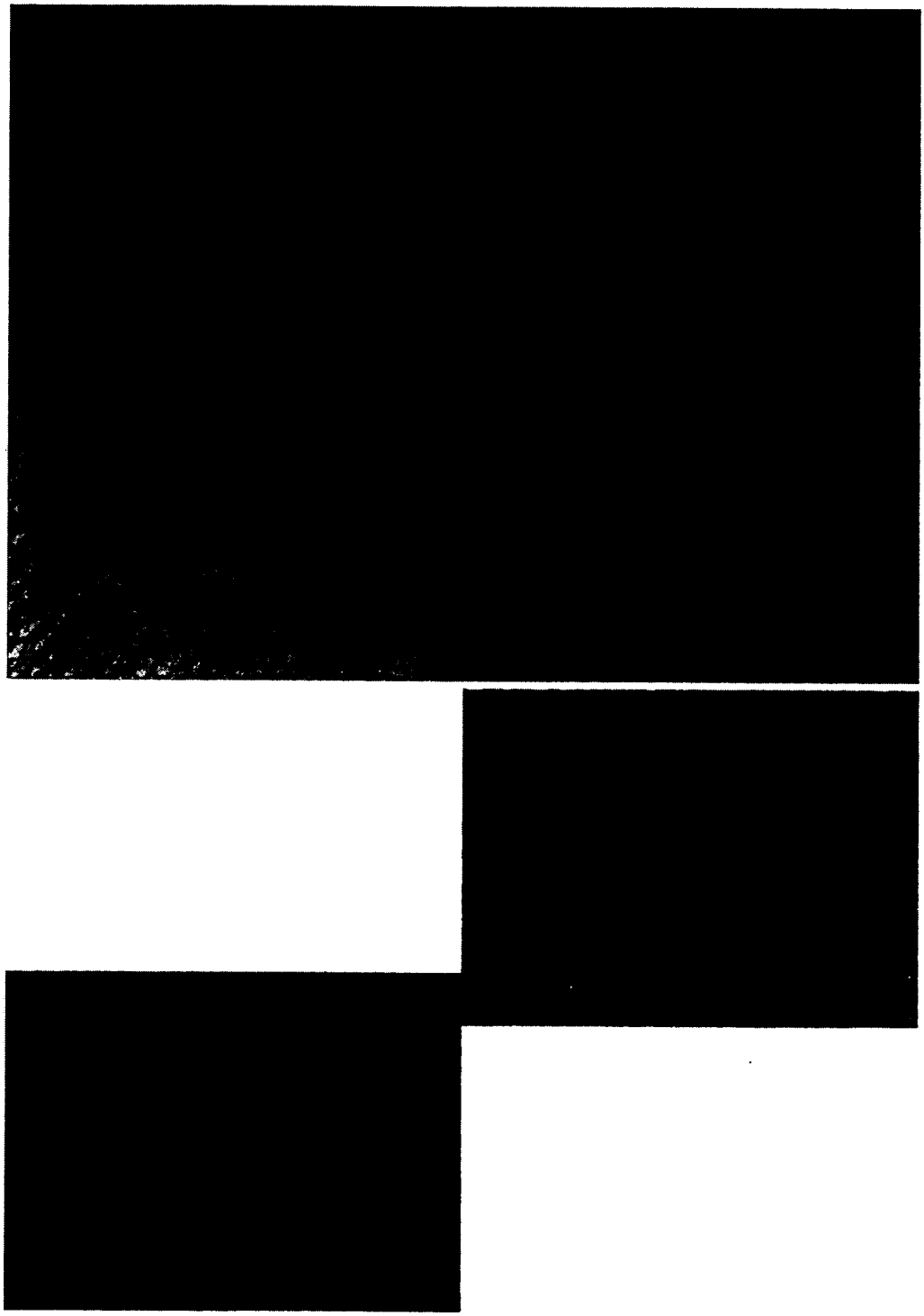

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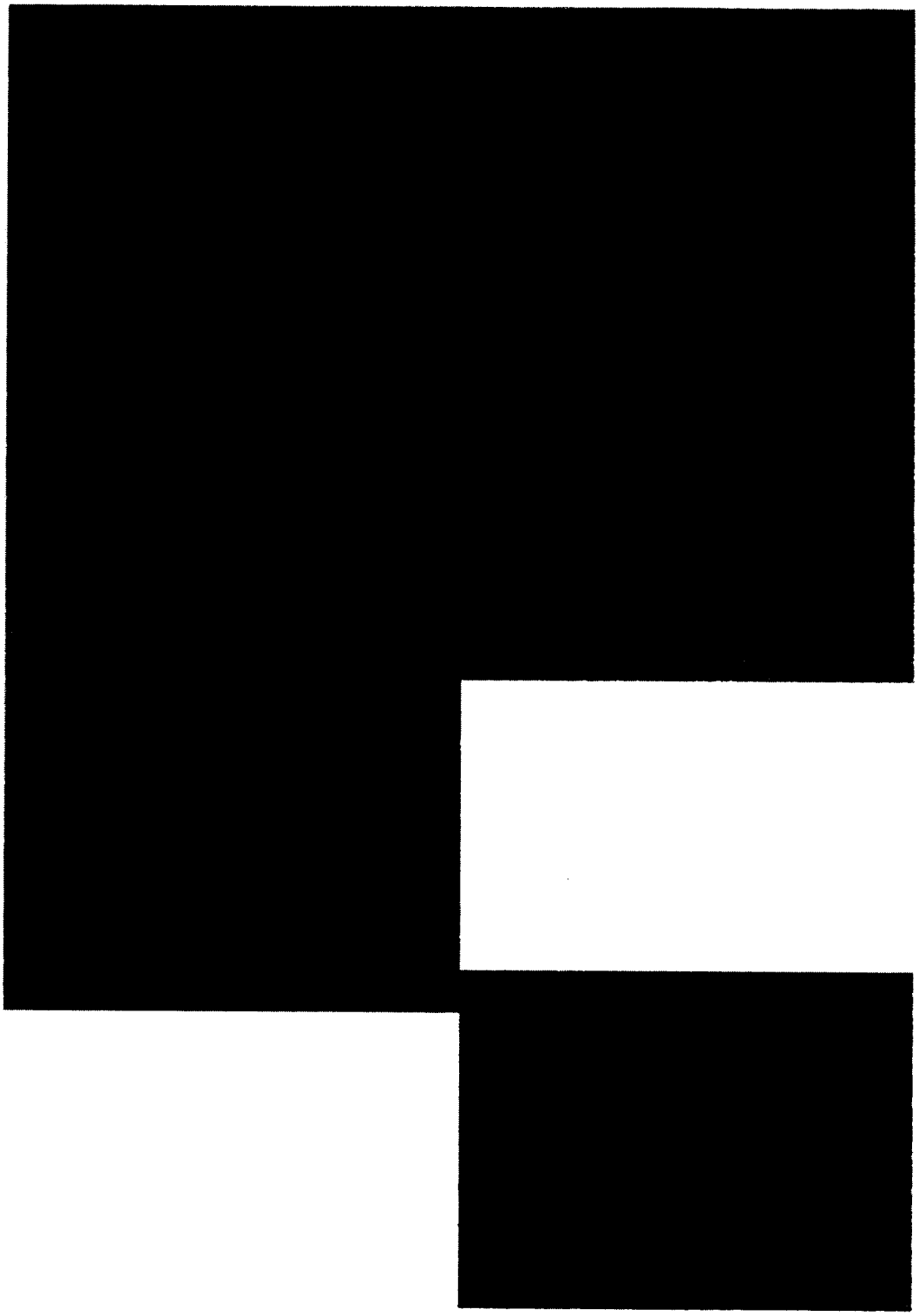

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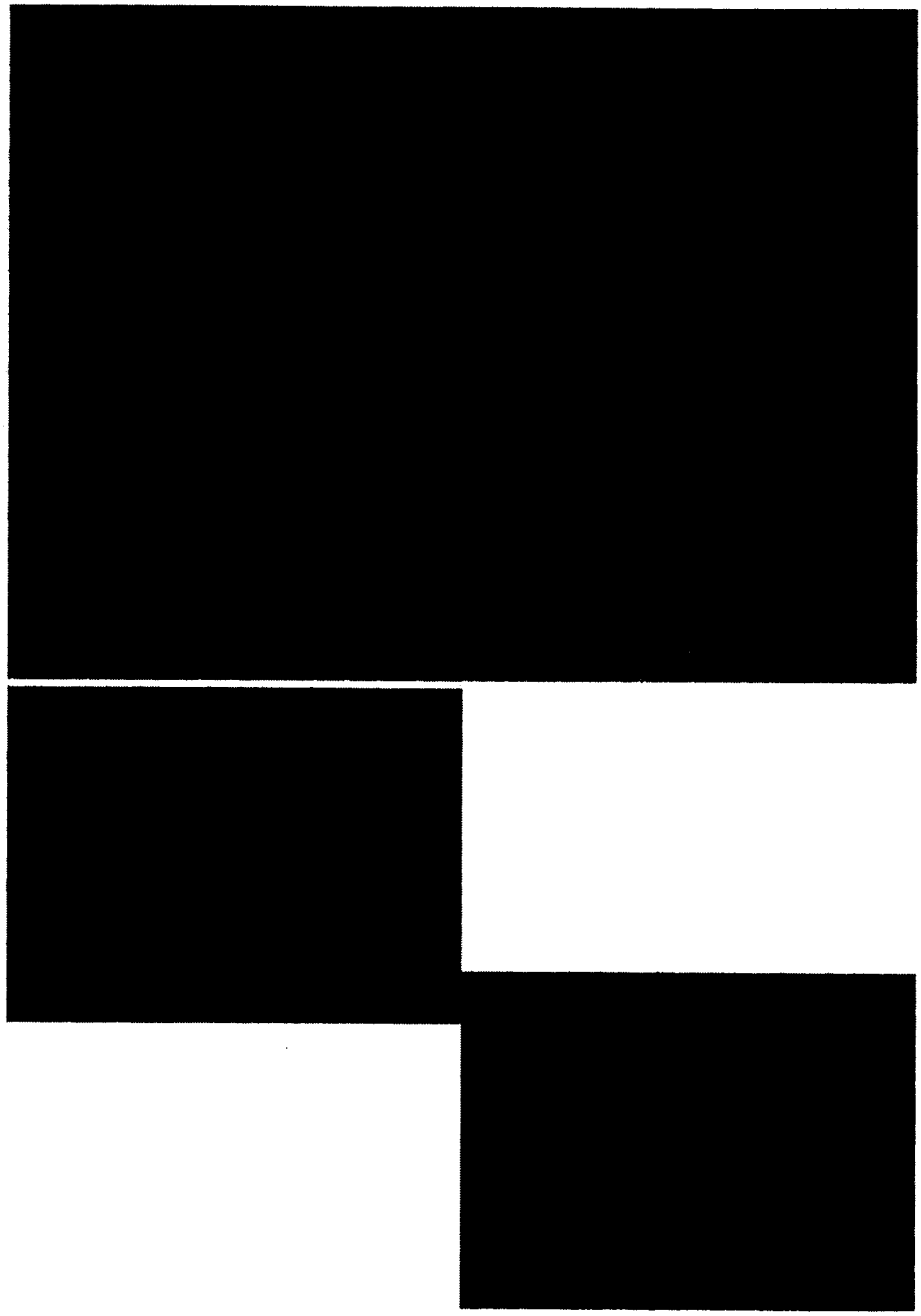

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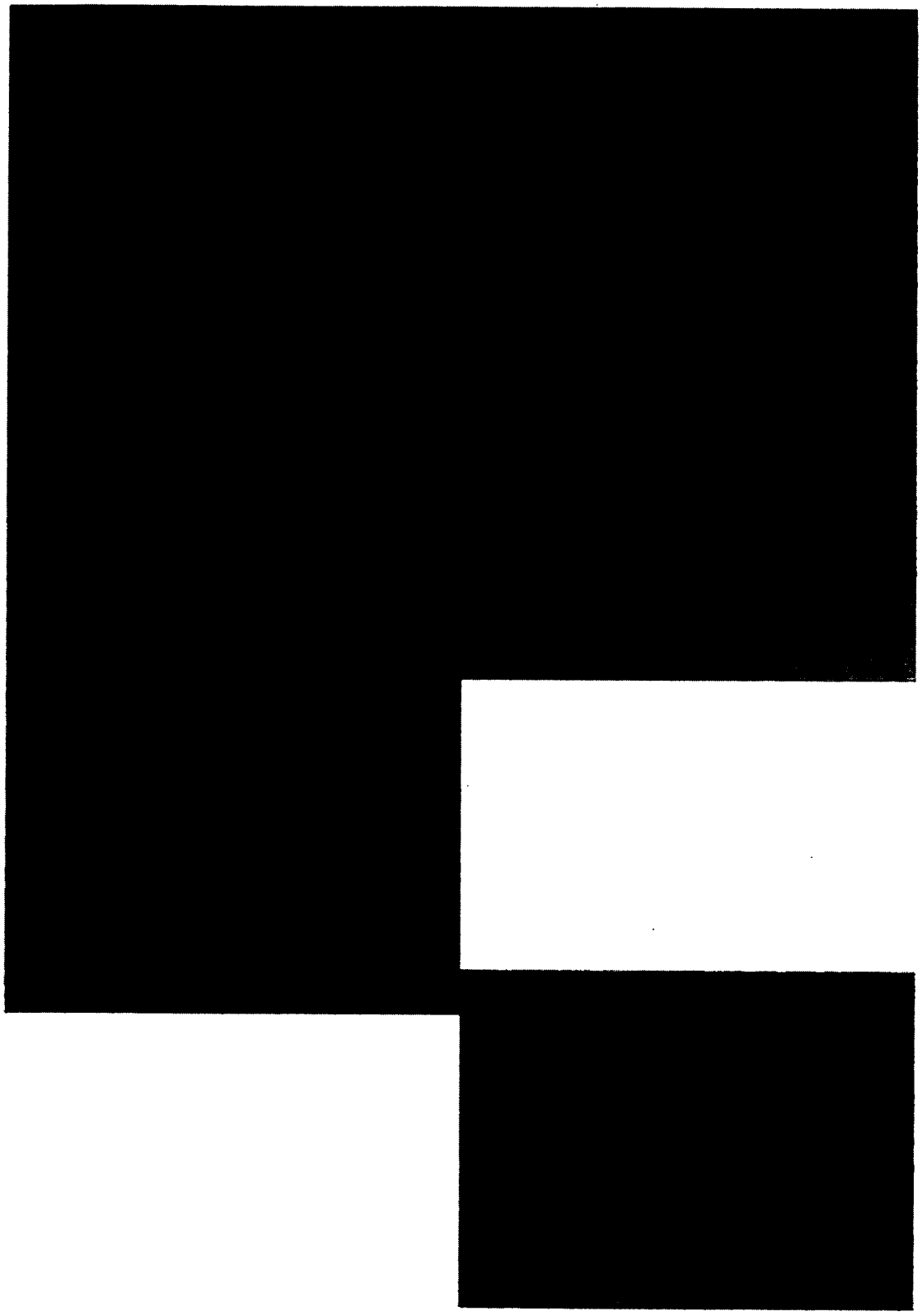

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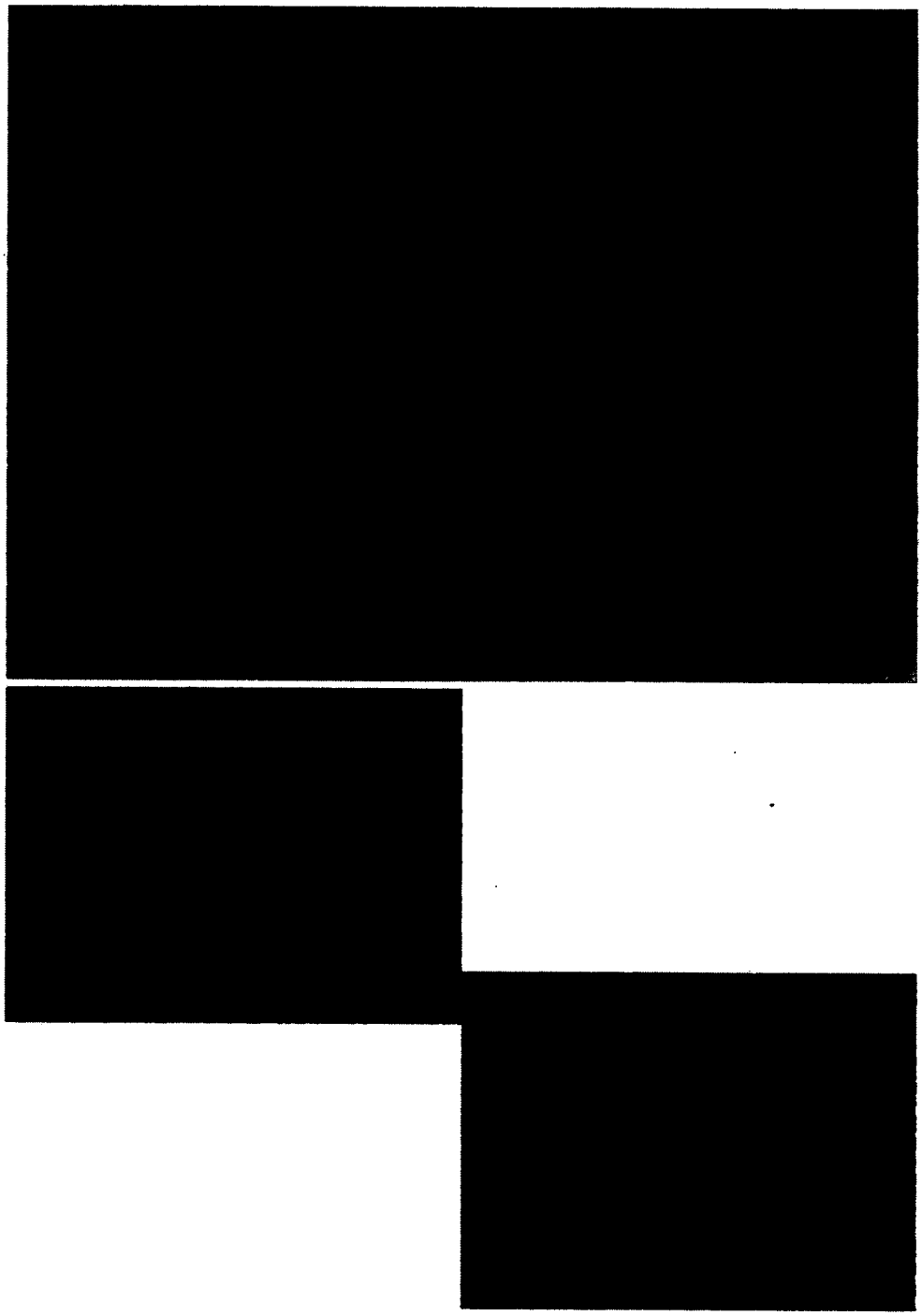

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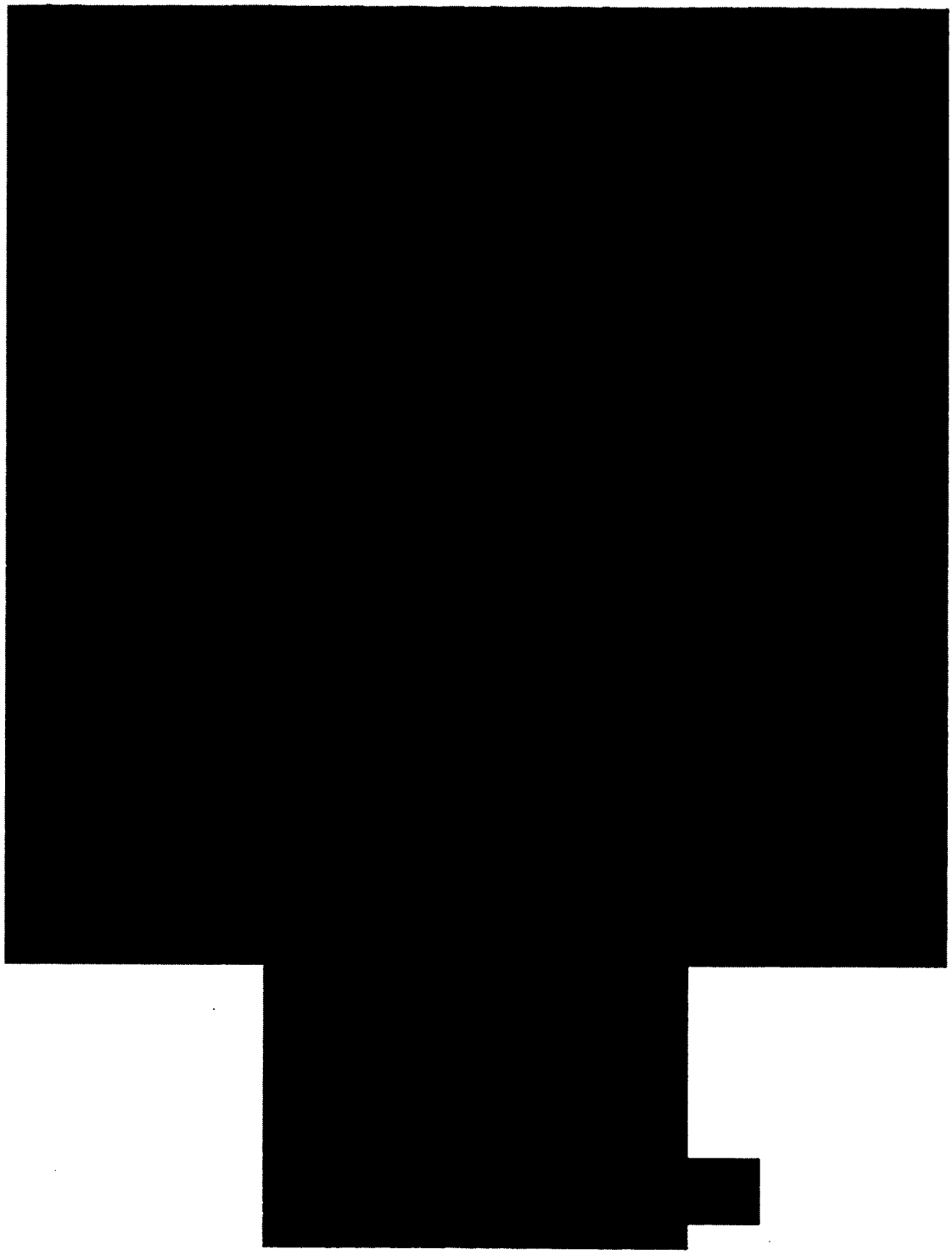

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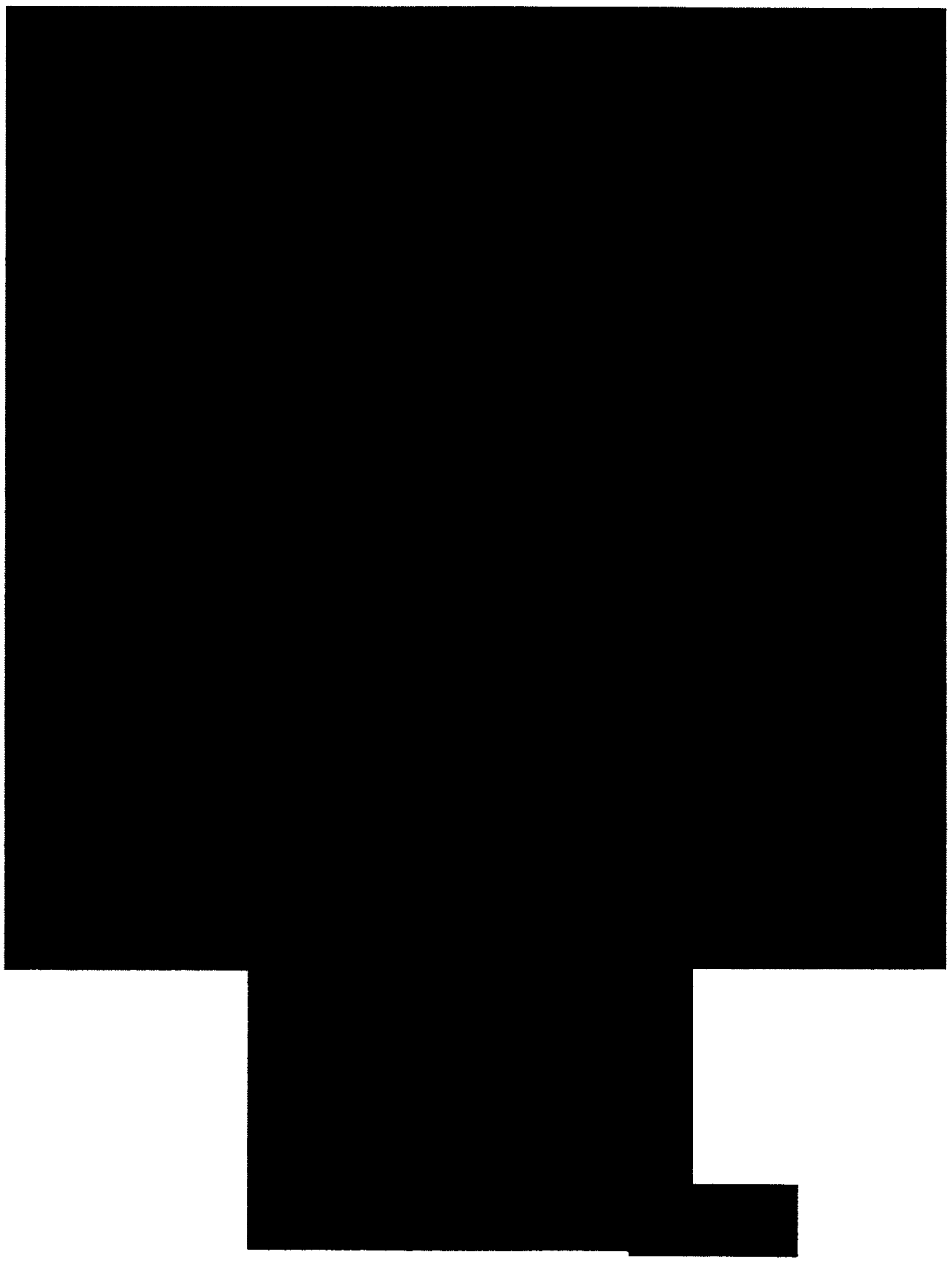

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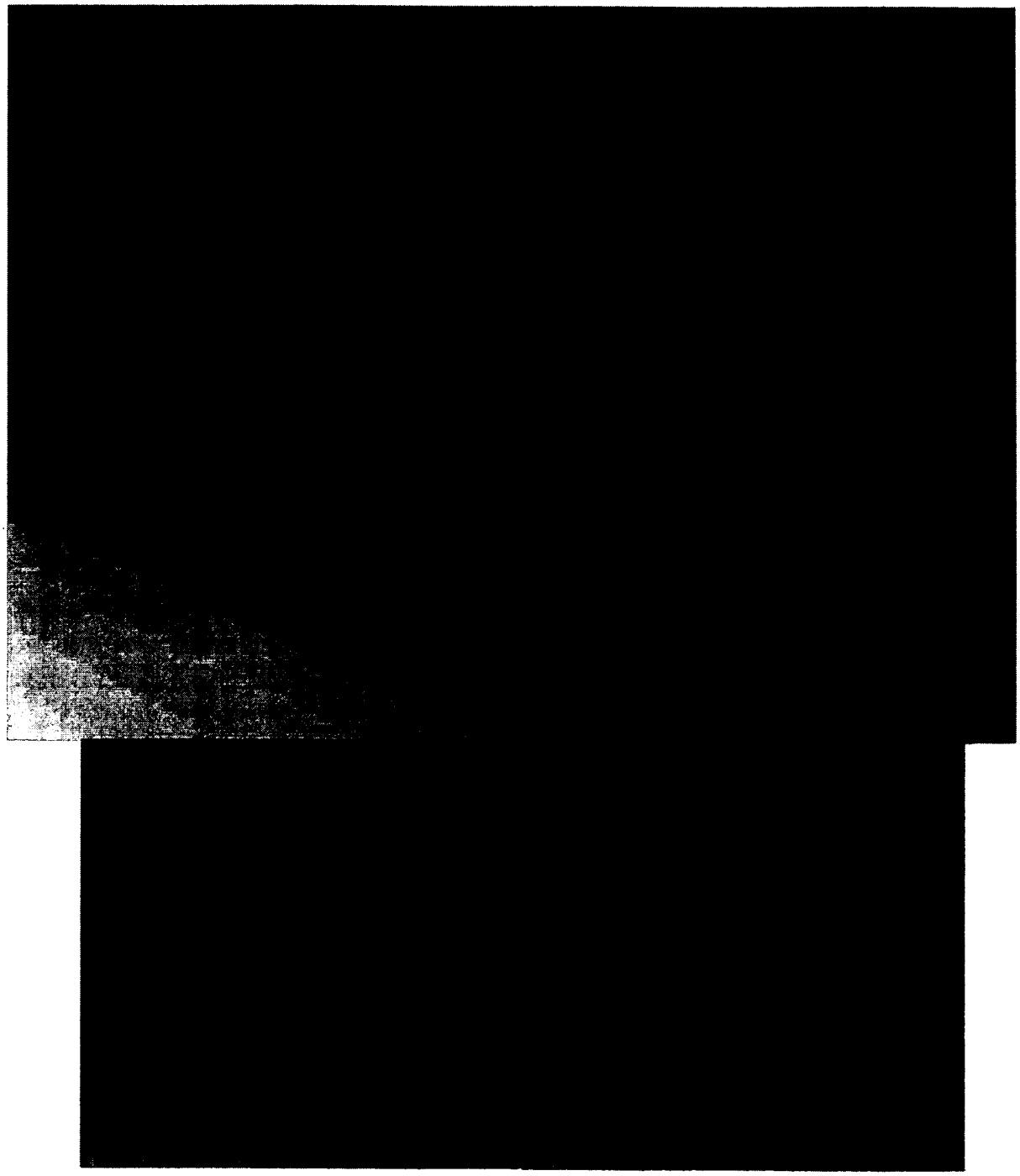

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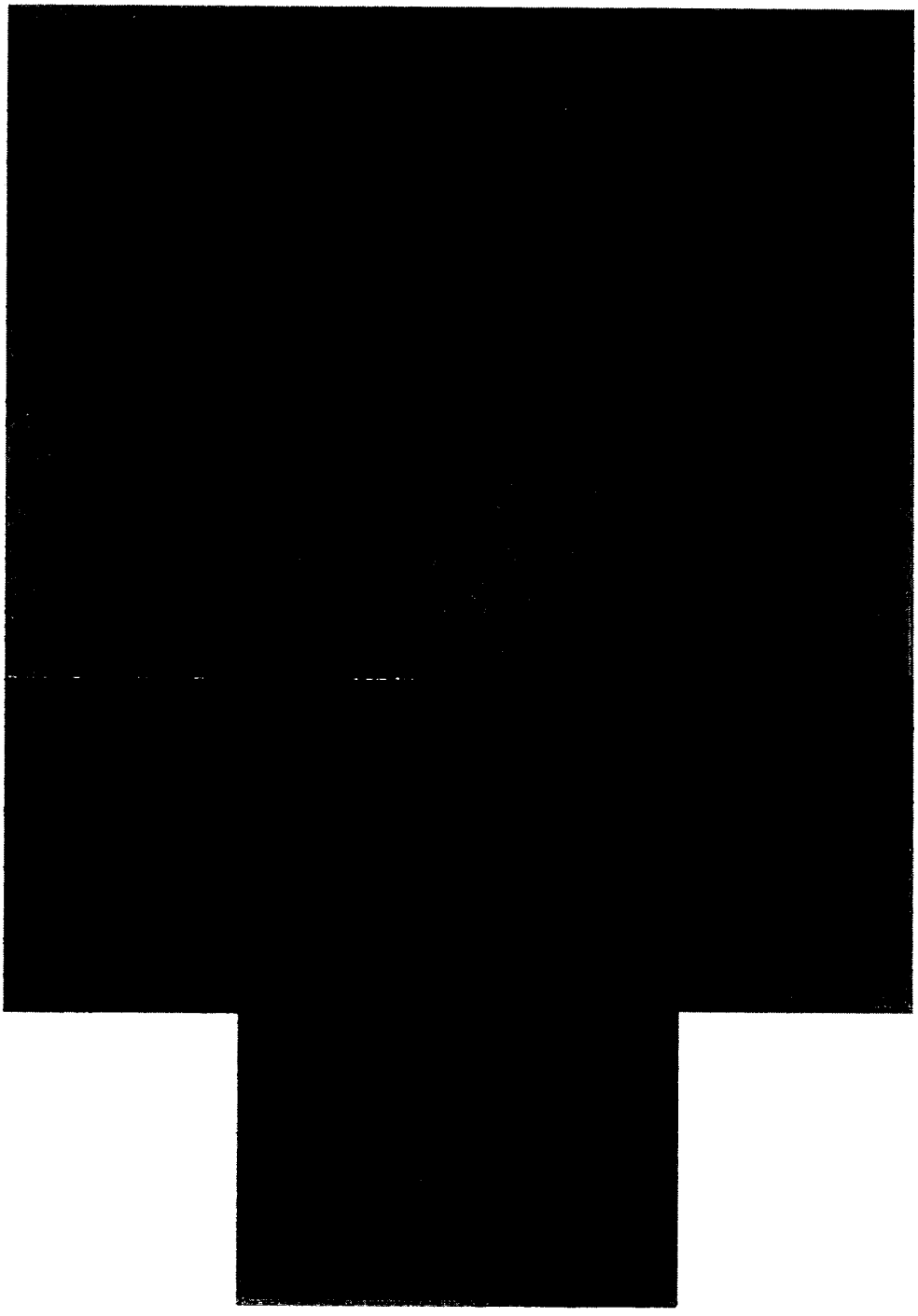

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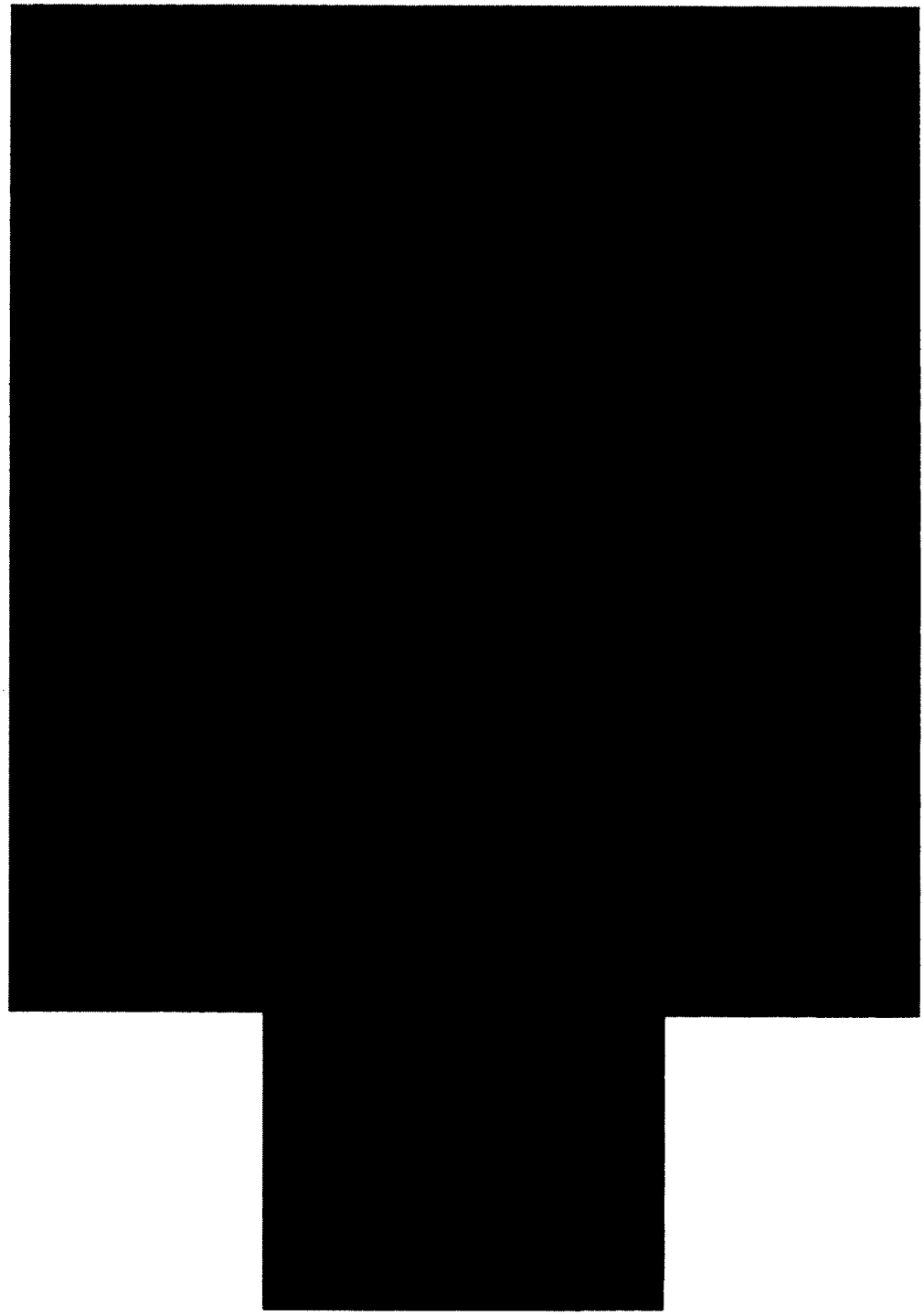

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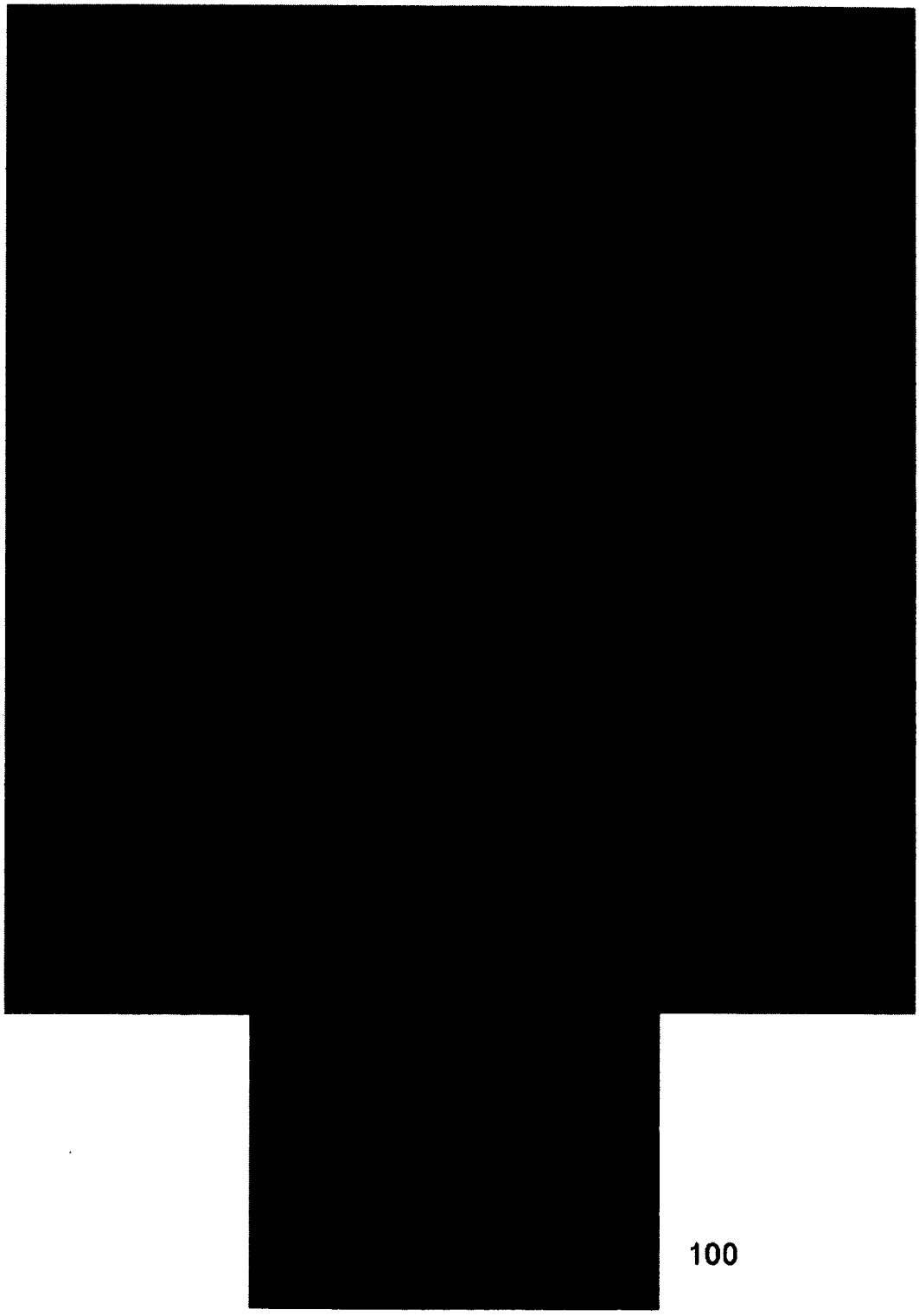

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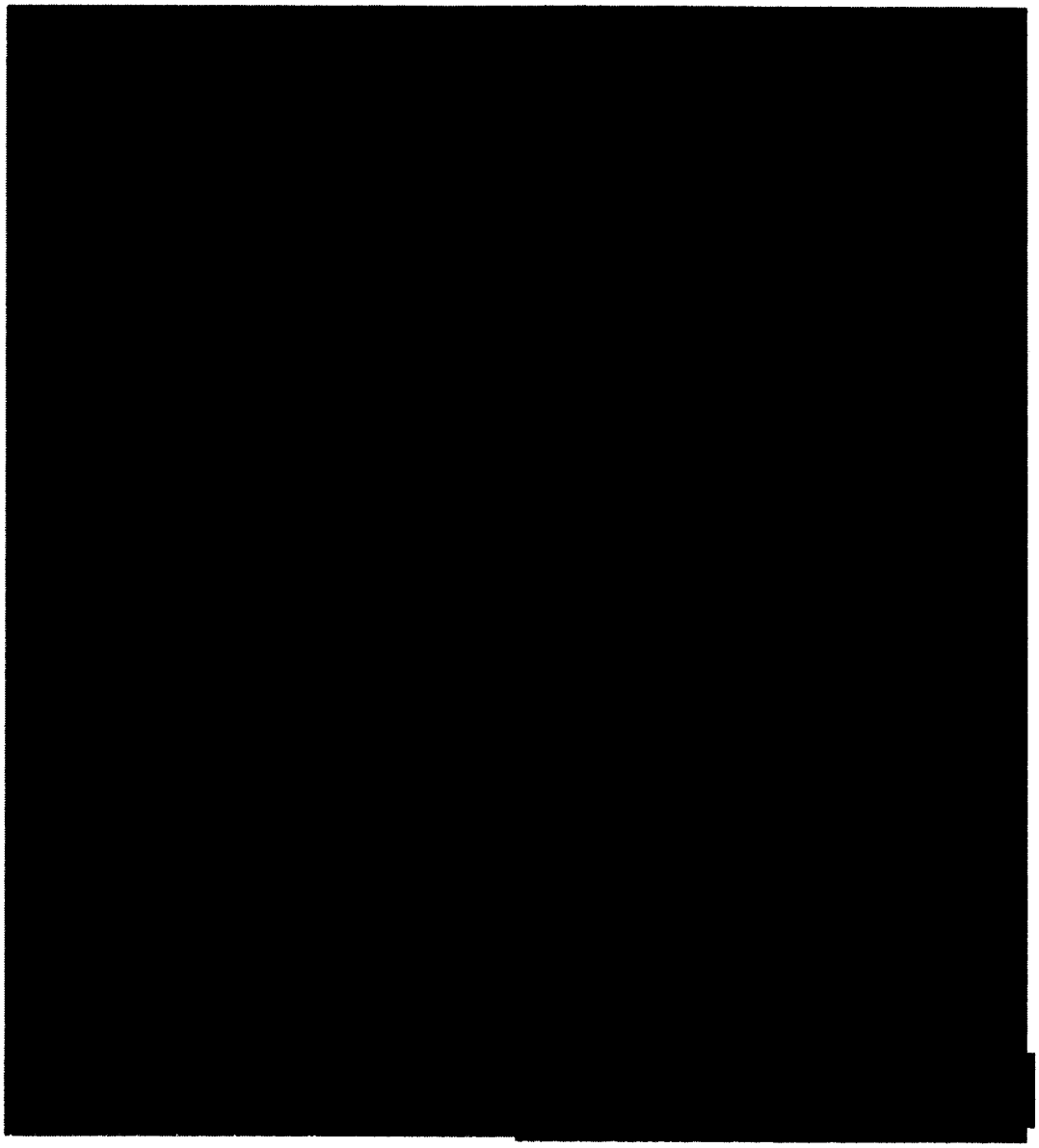

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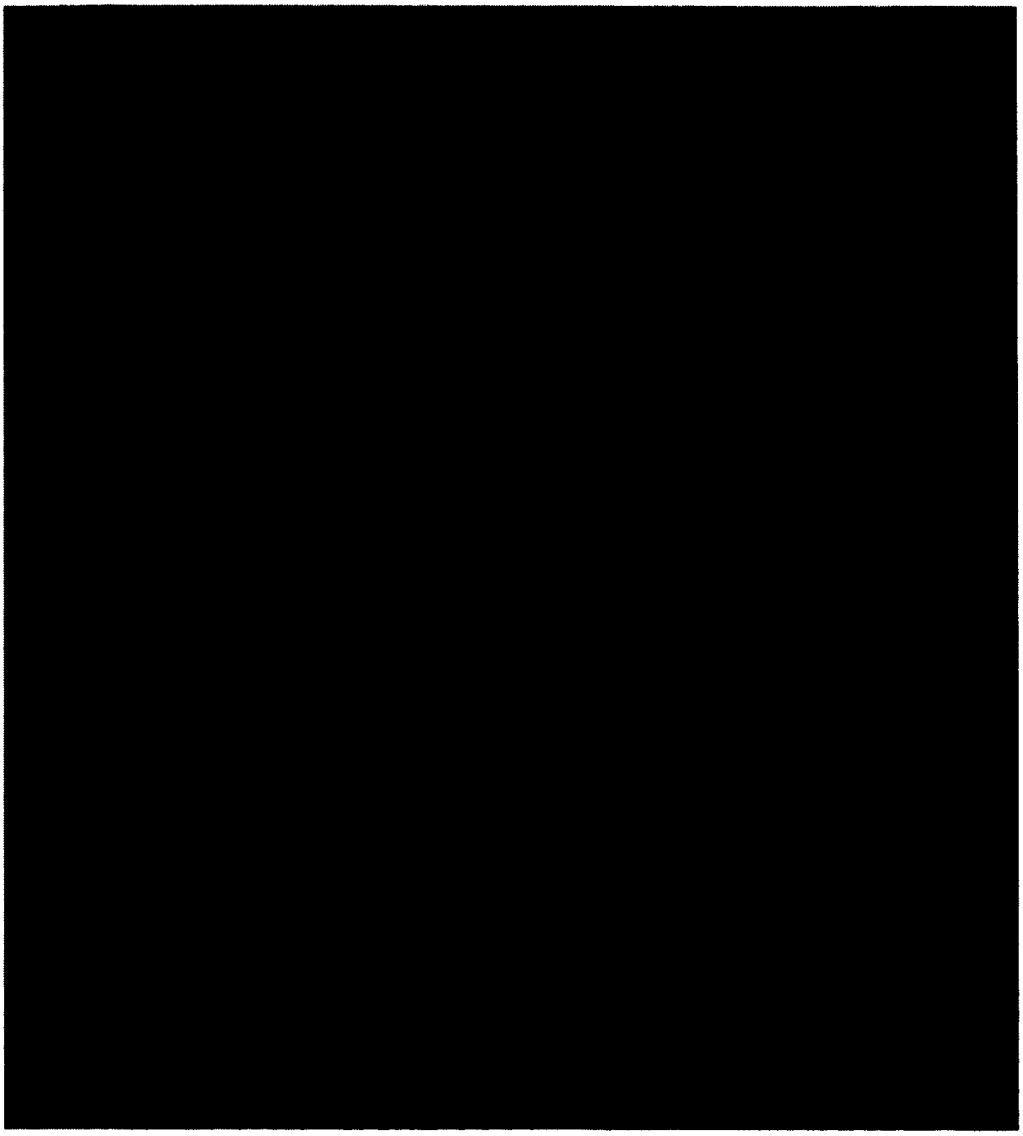


Fig. 18

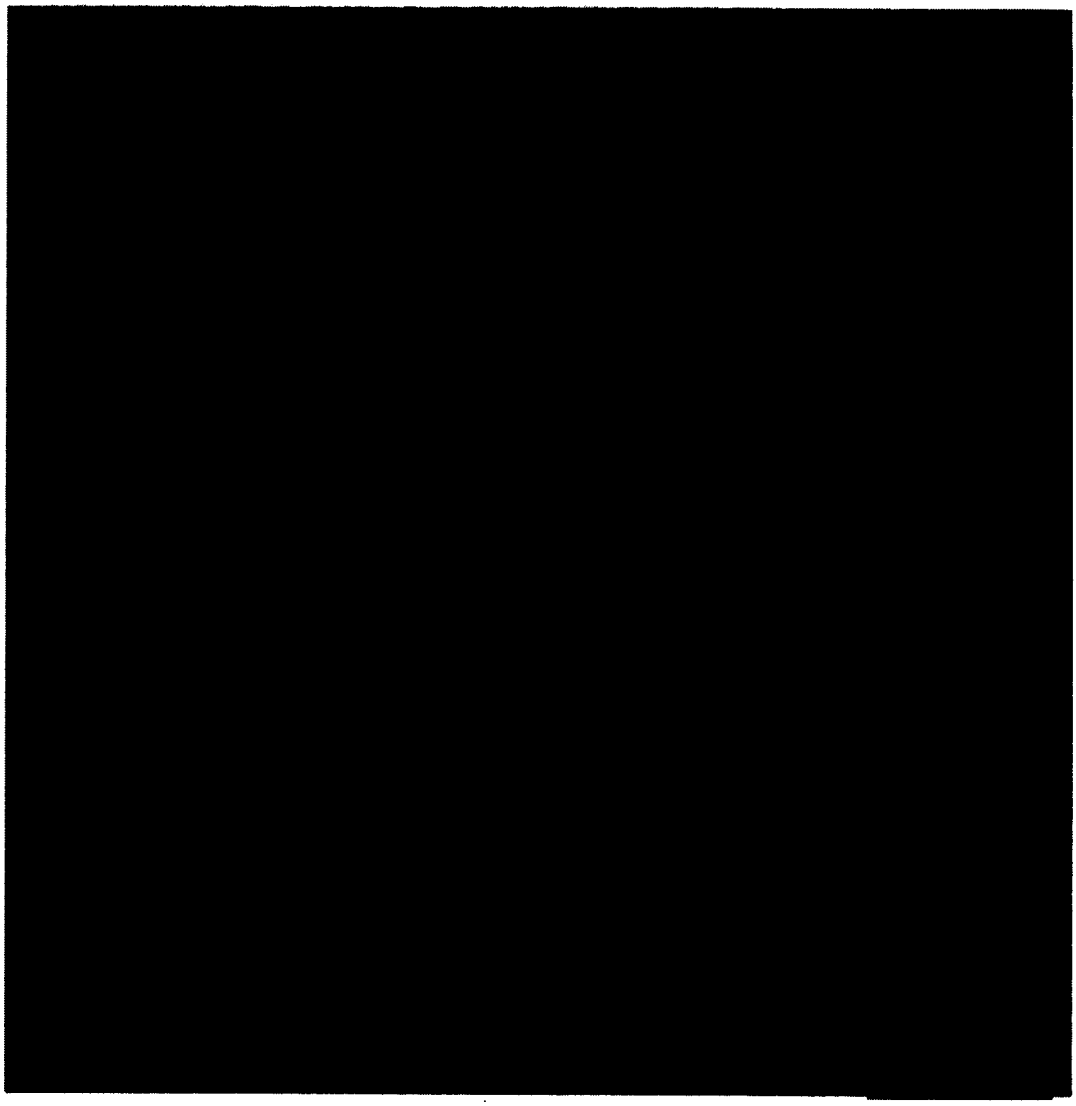


Fig. 19

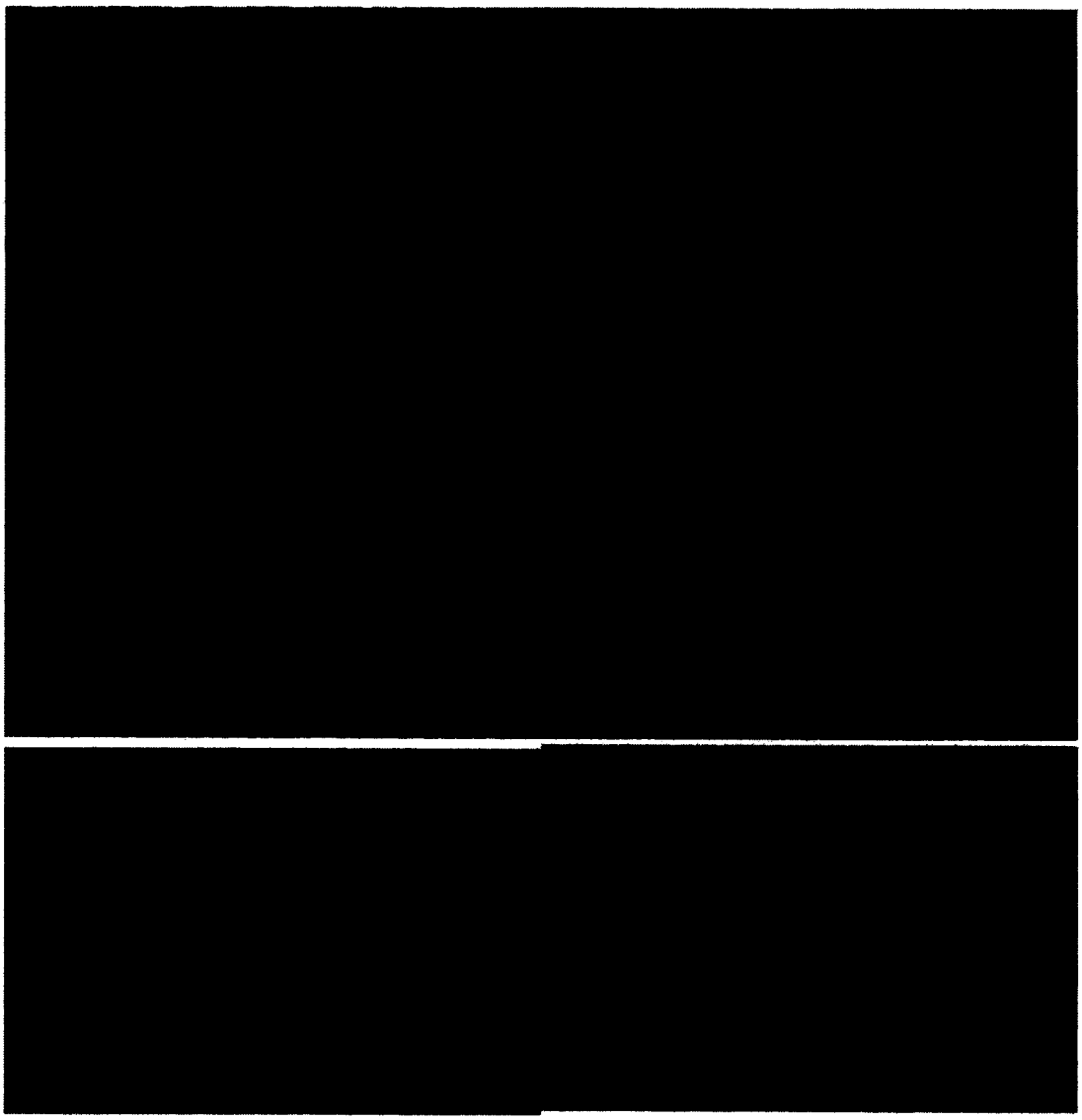
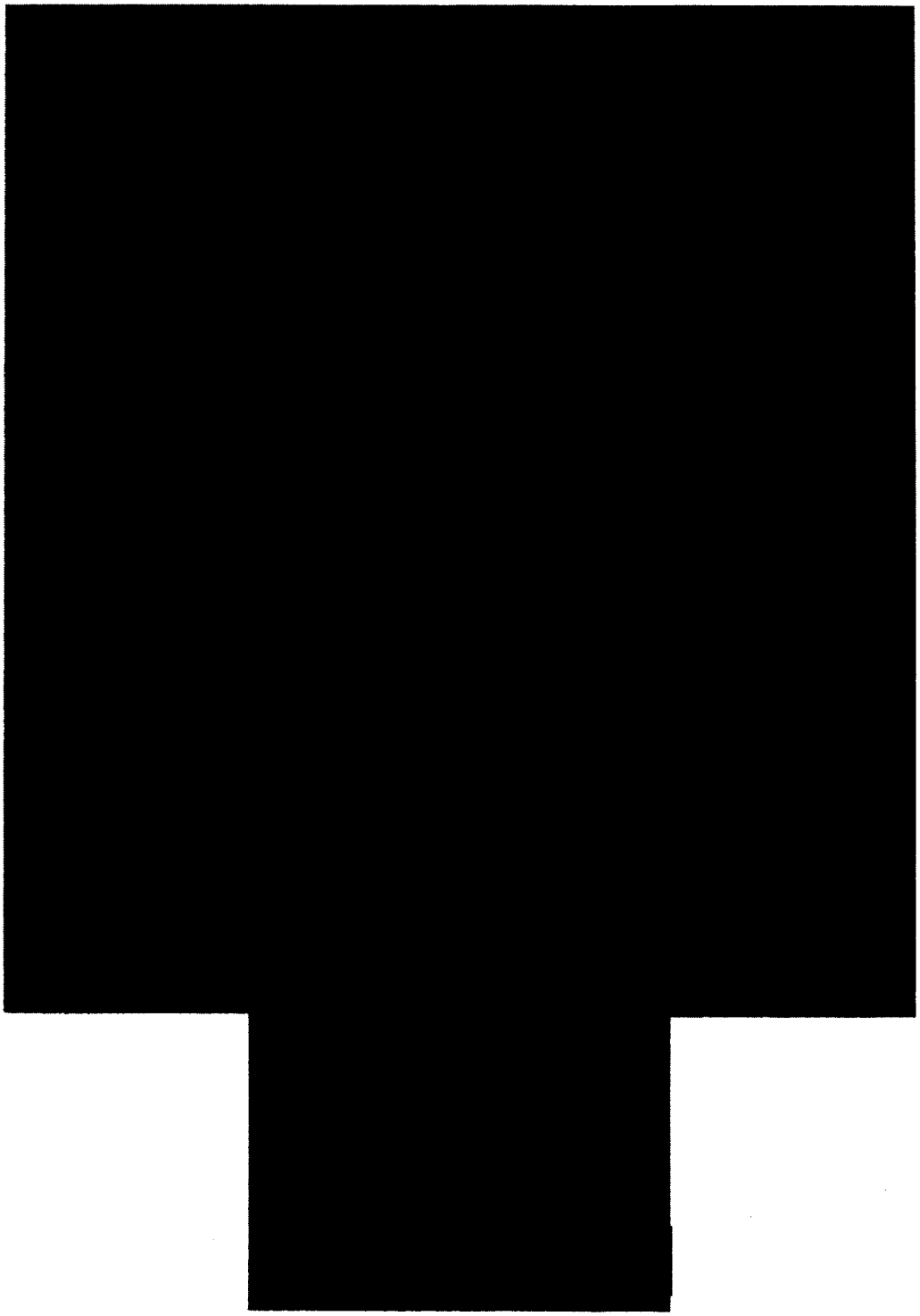


Fig. 20



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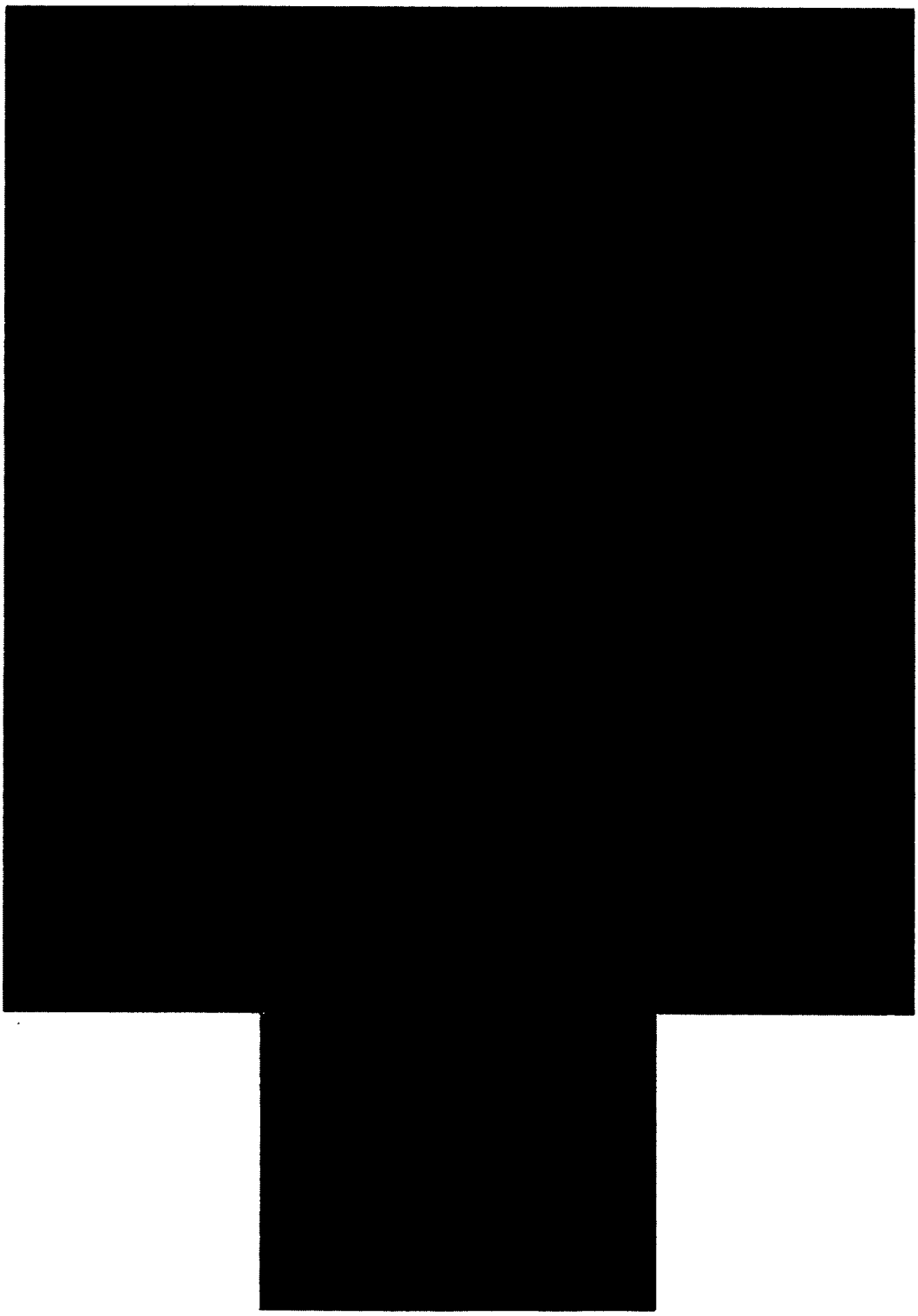

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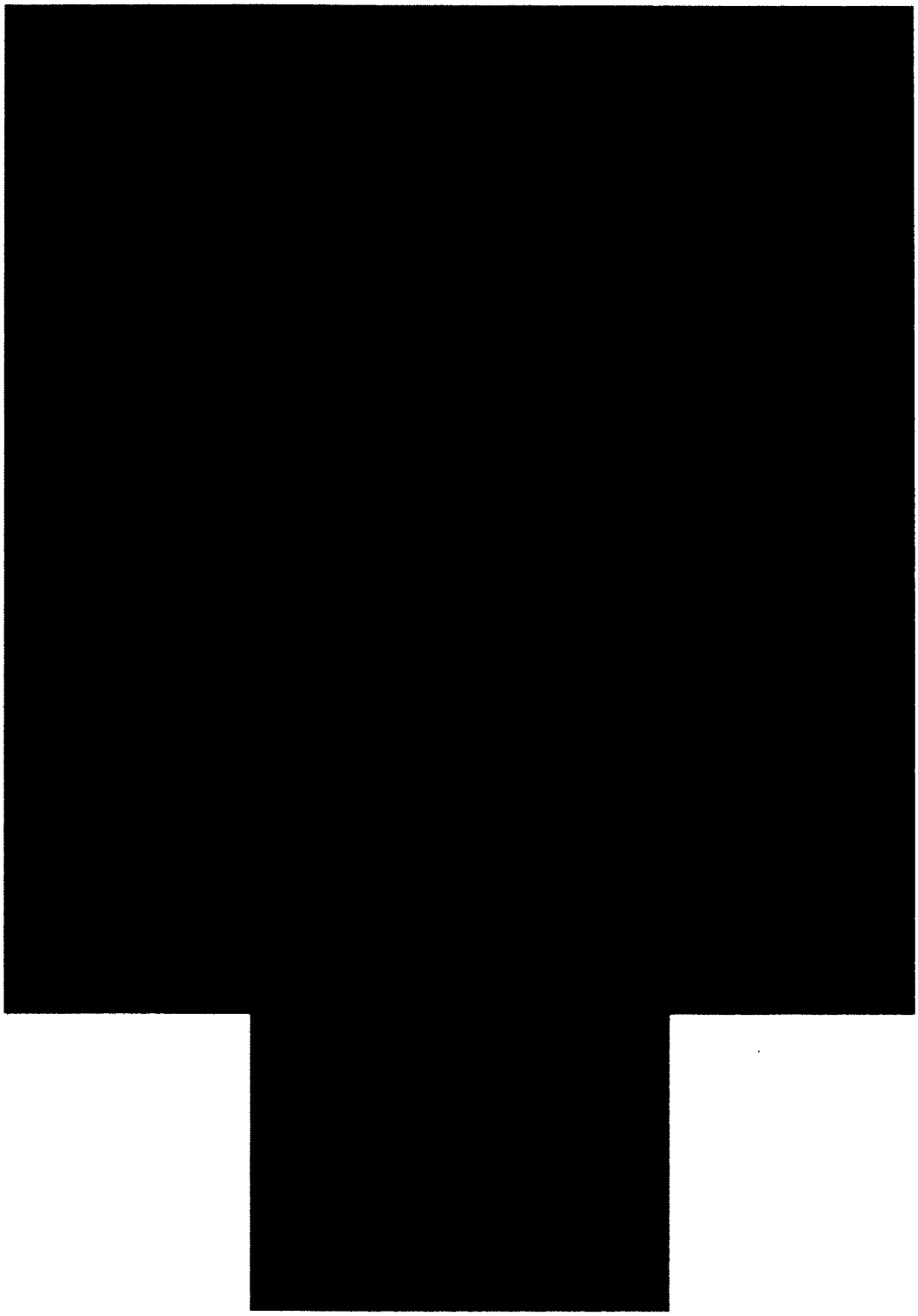

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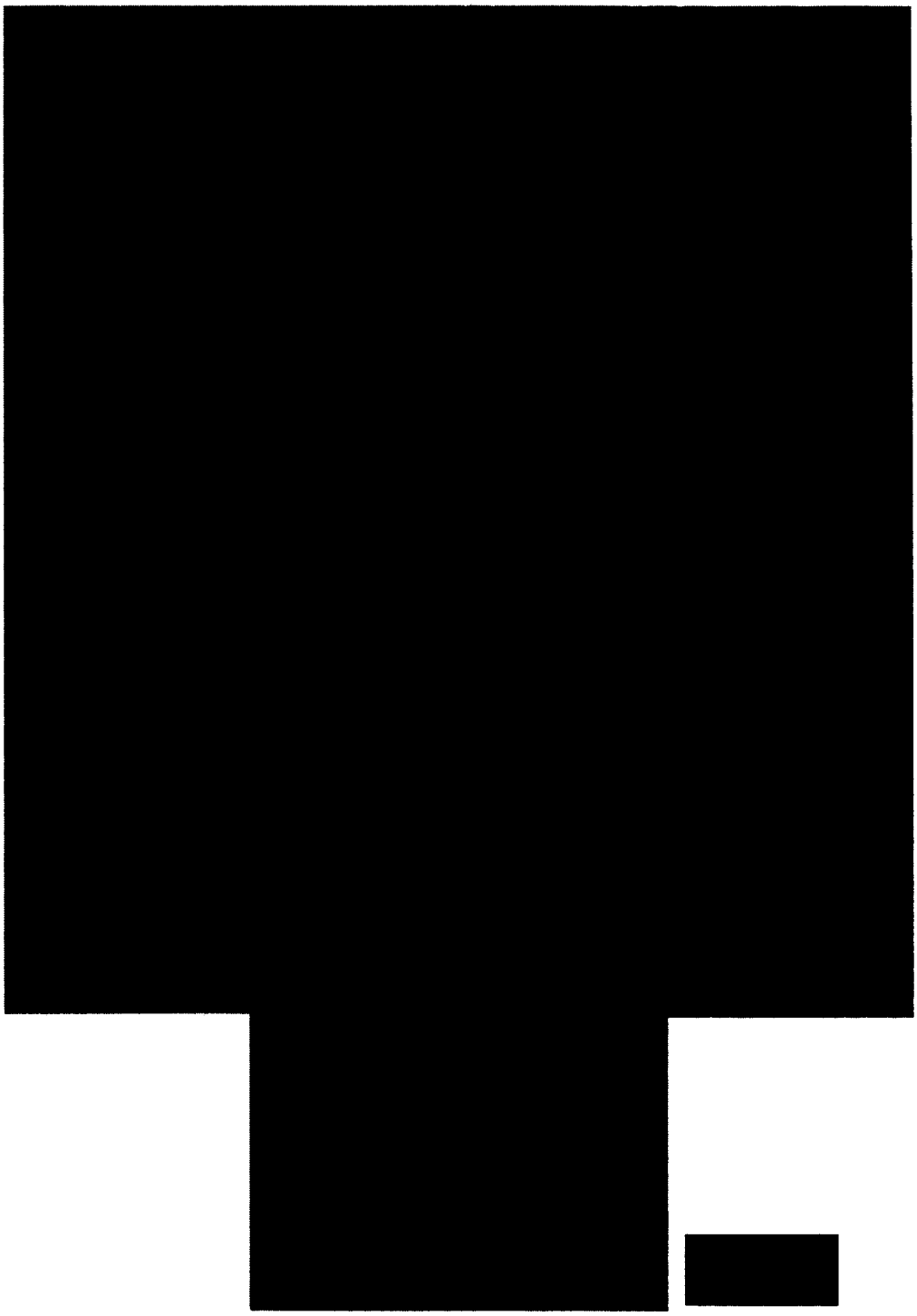


Fig. 24

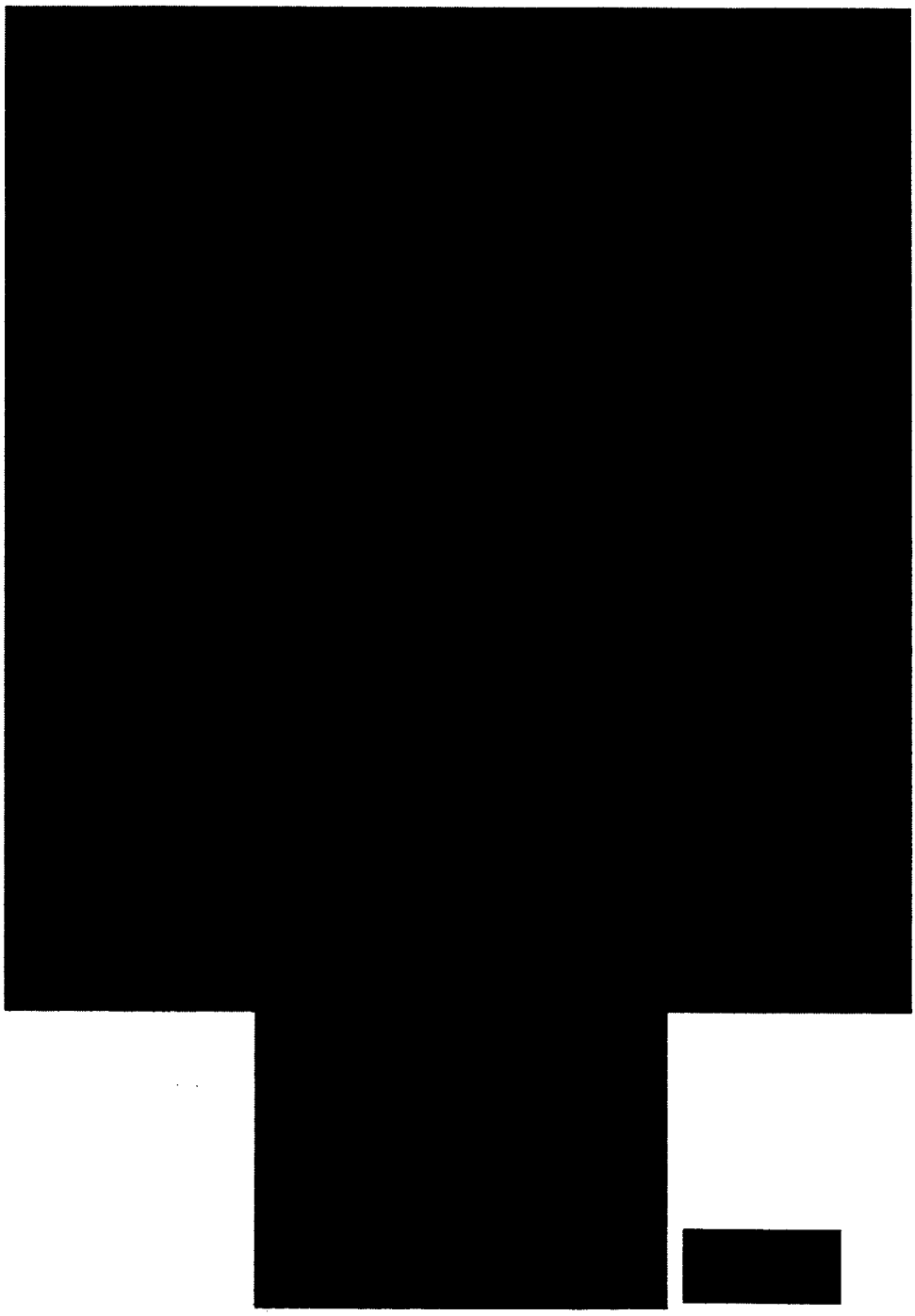


Fig. 25

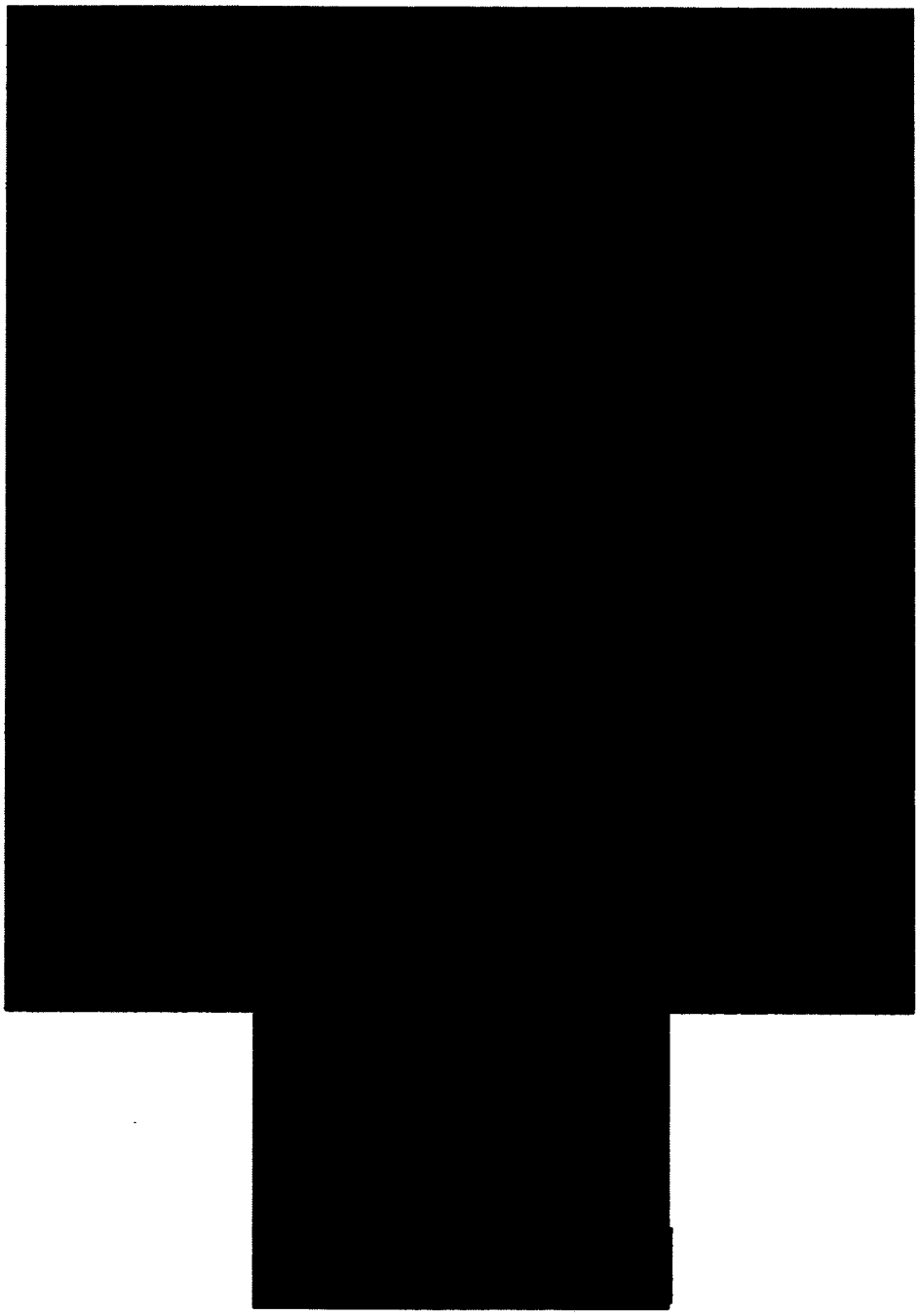
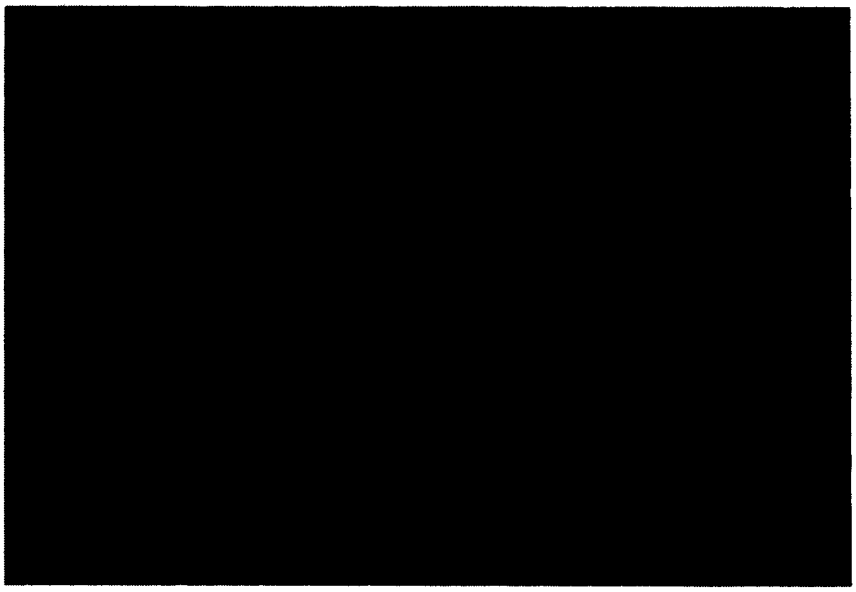
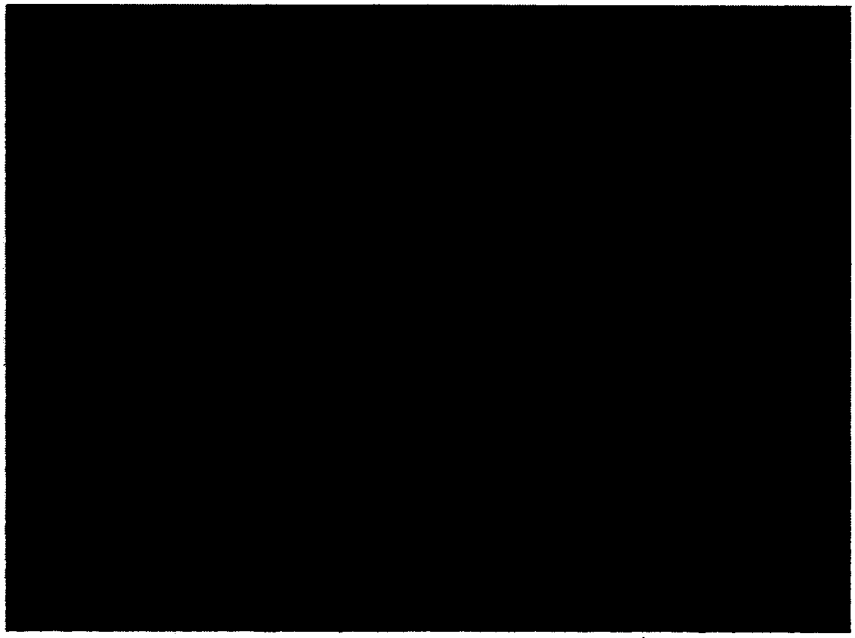


Fig. 26



50KGy

Fig. 27



100KGy

Fig. 28

Fig. 29

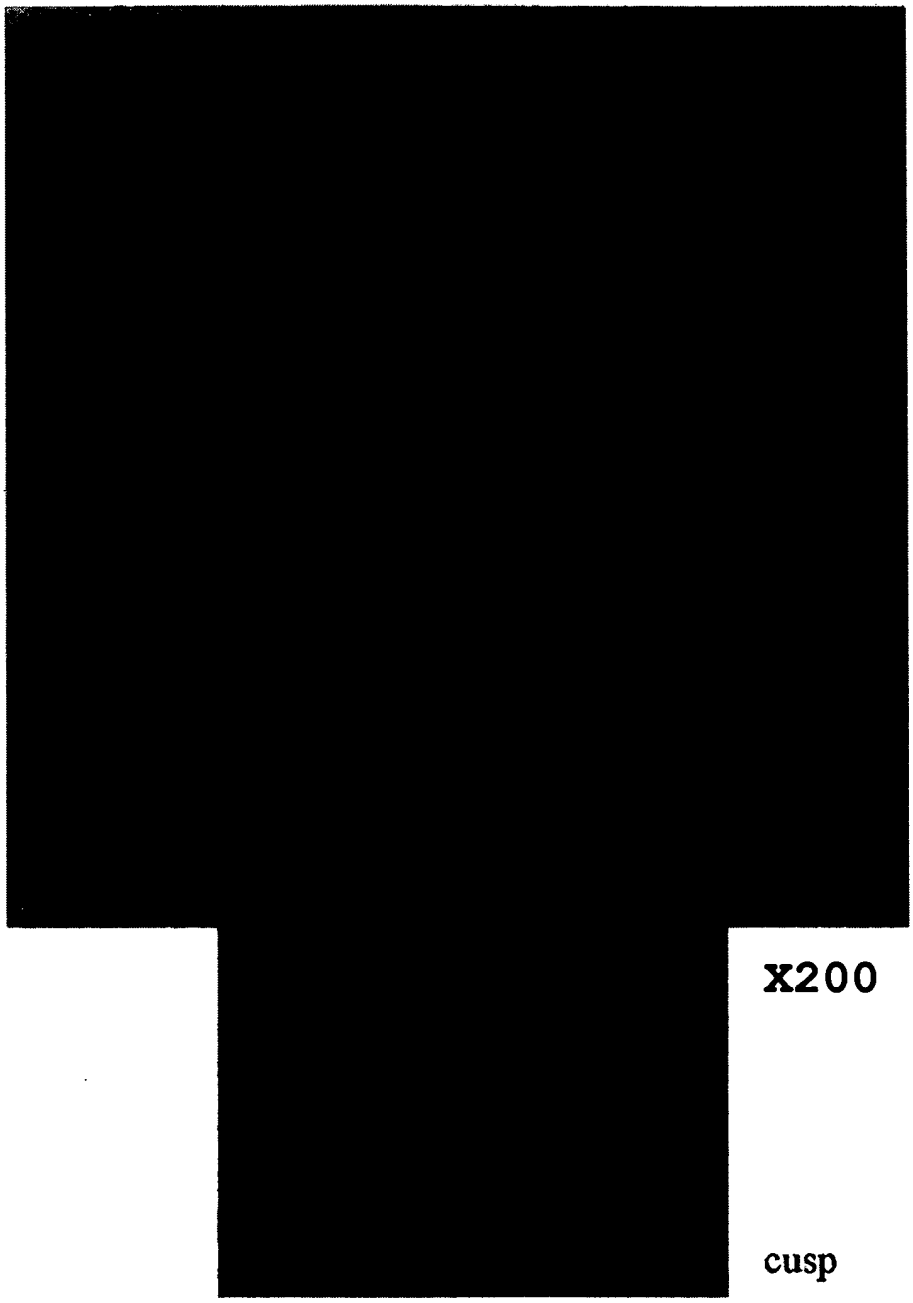
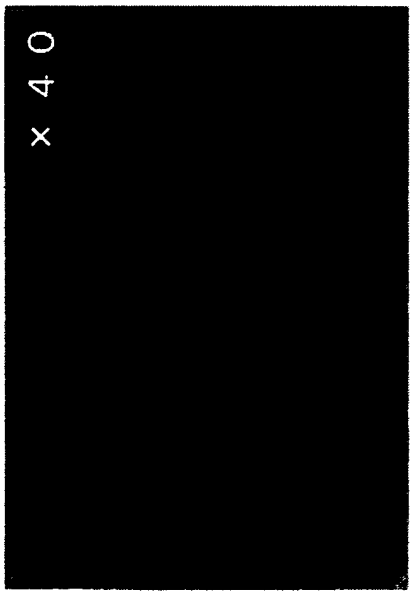
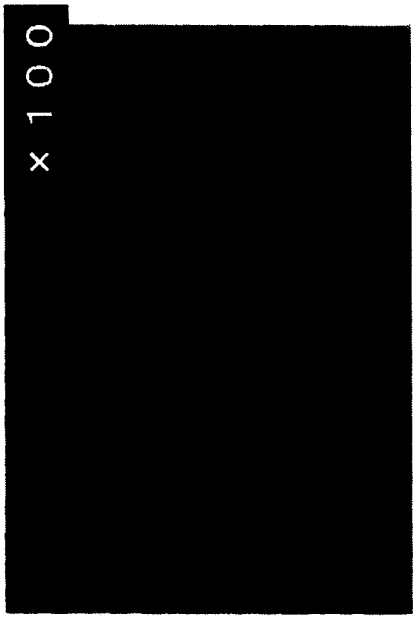


Fig. 30A

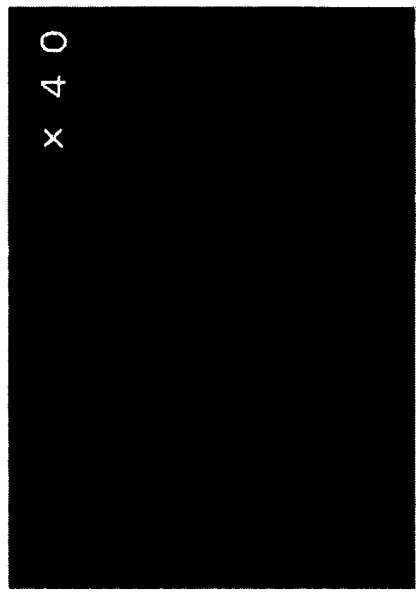
Valve PEG + γ :decellularization effects



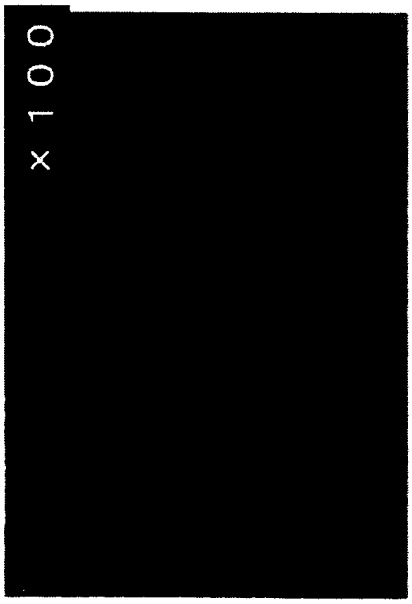
Treatment : PEG + γ-ray 100kGy
Object : valve
Magnification : X40



Treatment : PEG + γ-ray 100kGy
Object : valve
Magnification : X100



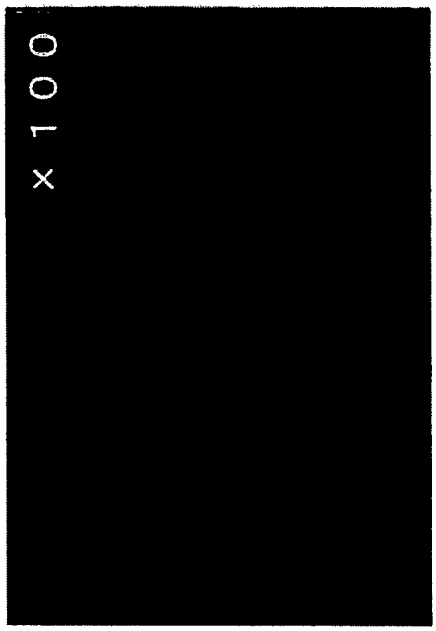
Treatment : PEG + γ-ray 100kGy
Object : valve
Magnification : X40



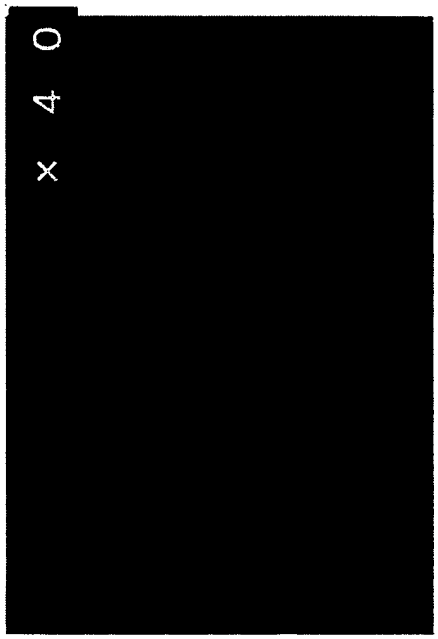
Treatment : PEG + γ-ray 100kGy
Object : valve
Magnification : X100

Fig. 30B

valve cusp PEG + γ :decellularization effects



Treatment : PEG + γ-ray 100kGy
Object : valve cusp
Magnification : X100



Treatment : PEG + γ-ray 100kGy
Object : valve cusp
Magnification : X40

Fig. 31

PEG **Results of tensile strength tests**

Testing machine	RTC series			Type of testing	Extension		
Load in full-scale	5 kgf			Rated capacity of load cell	100 N		
Range of load	40 %RO			Rated capacity of the extensometer	20 cm		
Range of the extensometer	unapplied			Test Speed	10.0 mm/min		
Recording speed off				Rigidity of the testing machine	0 mm/kgf		
Midpoint (load)	0	0	0	Midpoint	0	50	60
N	0	0	0	(extension) cm	0	0	0
Analysis of Elastic moduli	Interval	1	50	Initial length Distance between chunks	10 mm		
	Pitch	1 %max		origin in extension initial load point	0.03 N		
slack correction	applied			Determination of rupture point	0.5 N		
Storing SS curve	ON						

TestID=120 Test No.	Maximum load kgf	Maximum load N	Rupture load kgf	Rupture load N	Maximum Extension mm	Elastic Modulus MPa
1	1.3522	13.260	1.0889	10.678	16.227	2.3930
2	1.3049	12.797	1.0265	10.066	20.987	1.8916
3	0.9980	9.7870	0.9281	9.1012	14.327	1.8013
4	1.0020	9.8261	0.7277	7.1365	16.367	1.5761
5	0.7636	7.4879	0.7340	7.1981	4.2267	4.7653
Average	1.0841	10.632	0.9010	8.8360	14.427	2.4855
JIS weighted avg	1.2675	12.430	1.0186	9.9888	18.459	3.4698
Median	1.0020	9.8261	0.9281	9.1012	16.227	1.8916
Maximum	1.3522	13.260	1.0889	10.678	20.987	4.7653
SD(n-1)	0.2437	2.3897	0.1656	1.6239	6.2066	1.3090
SD(n)	0.2180	2.1374	0.1481	1.4525	5.5513	1.1708

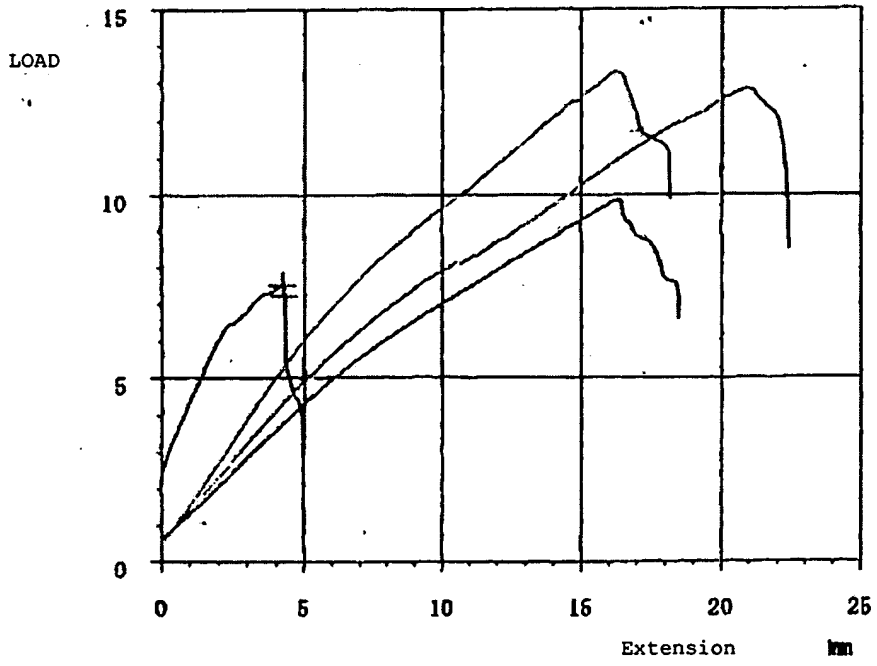


Fig. 32

Results of tensile test of native canine aorta.

Testing machine	RTC series			Type of testing	Extension		
Load in full-scale	5 kgf			Rated capacity of load cell	100 N		
Range of load	40 %RO			Rated capacity of the extensometer	20 cm		
Range of the extensometer	unapplied			Test Speed	10.0 mm/min		
Recording speed off				Rigidity of the testing machine	0 mm/kgf		
Midpoint (load)	0	0	0	Midpoint	0	50	60
N	0	0	0	(extension) cm	0	0	0
Analysis of Elastic moduli	Interval	1	50	Initial length Distance between chunks	10 mm		
	Pitch	1 %max		origin in extension initial load point	0.03 N		
slack correction	applied			Determination of rupture point	0.5 N		
Storing SS curve	ON						

TestID=37 Test No.	Maximum load kgf	Maximum load N	Rupture load kgf	Rupture load N	Maximum Extension mm	Elastic Modulus MPa
1	0.7591	7.4445	0.5038	4.9404	27.887	1.0918
Average	0.7591	7.4445	0.5038	4.9404	27.887	1.0918
JIS weighted avg	0.7591	7.4445	0.5038	4.9404	27.887	1.0918
Median	0.7591	7.4445	0.5038	4.9404	27.887	1.0918
Maximum	0.7591	7.4445	0.5038	4.9404	27.887	1.0918

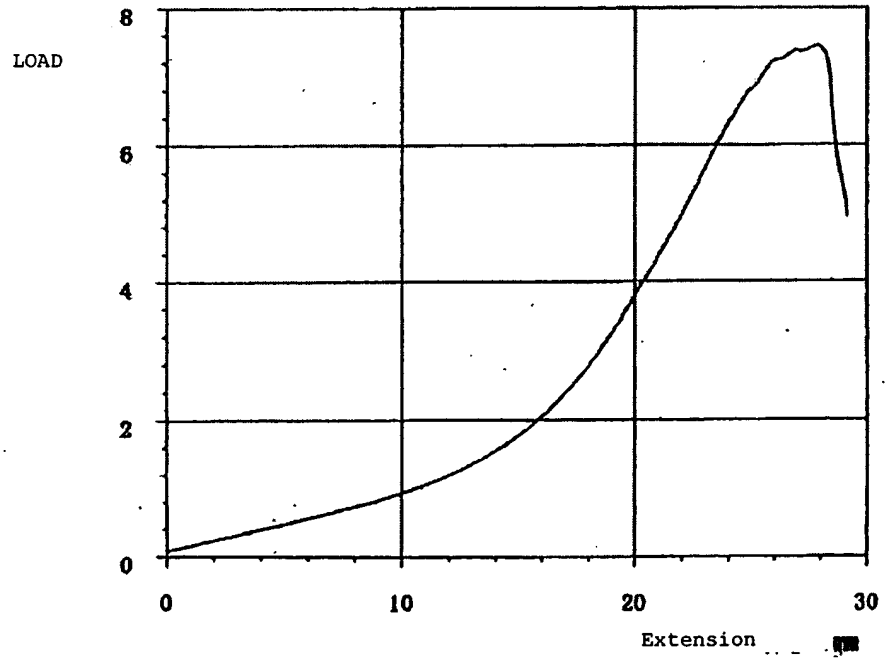


Fig. 33

results of tensile test of conventional artificial valves by means of decellularization cell method by SDS

Testing machine	RTC series			Type of testing	Extension		
Load in full-scale	5 kgf			Rated capacity of load cell	100 N		
Range of load	40 %RO			Rated capacity of the extensometer	20 cm		
Range of the extensometer	unapplied			Test Speed	10.0 mm/min		
Recording speed off				Rigidity of the testing machine	0 mm/kgf		
Midpoint (load)	0	0	0	Midpoint	0	50	60
N	0	0	0	(extension) cm	0	0	0
Analysis of Elastic moduli	Interval	1	50	Initial length Distance between chunks	10 mm		
	Pitch	1 %max		origin in extension initial load point	0.03 N		
slack correction	applied			Determination of rupture point	0.5 N		
Storing SS curve	ON						

TestID=17	Maximum load	Maximum load	Rupture load	Rupture load	Elastic Modulus
Test No.	kgf	N	kgf	N	MPa
1	1.0401	10.200	1.0284	10.085	2.5168
2	0.7095	6.9574	0.6856	6.7231	1.4561
3	0.7142	7.0038	0.6339	6.2164	1.4976
4	0.8572	8.4063	0.8503	8.3387	1.6630
5	0.6693	6.5639	0.6613	6.4847	1.1928
Average	0.7981	7.8263	0.7719	7.5696	1.6653
JIS weighted avg.	0.9196	9.0180	0.9040	8.8649	2.0527
Median	0.7142	7.0038	0.6856	6.7231	1.4976
Maximum	1.0401	10.200	1.0284	10.085	2.5168
SD(n-1)	0.1529	1.4996	0.1663	1.6313	0.6050
SD(n)	0.1368	1.3413	0.1488	1.4591	0.4517

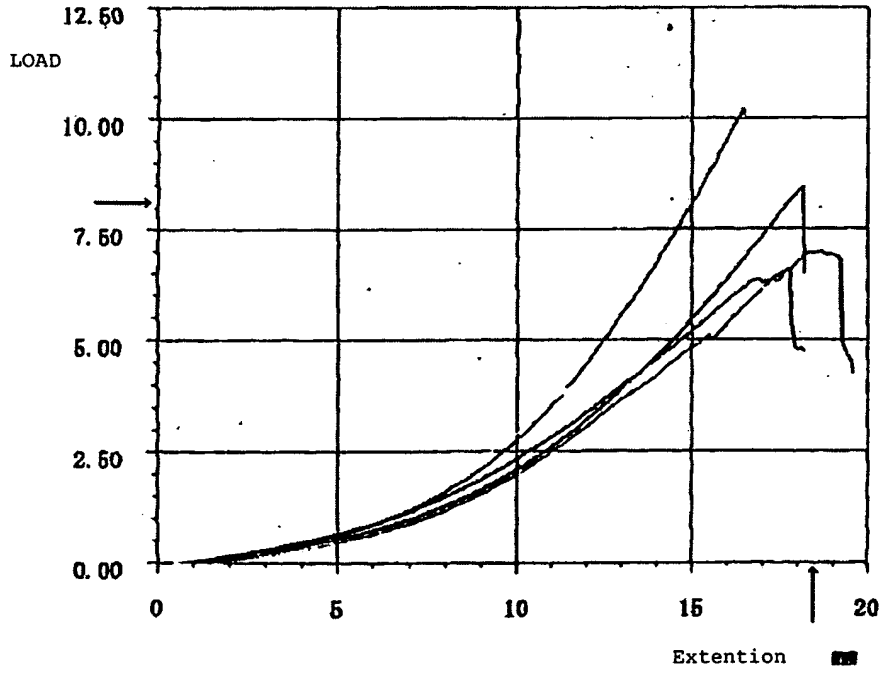


Fig. 34

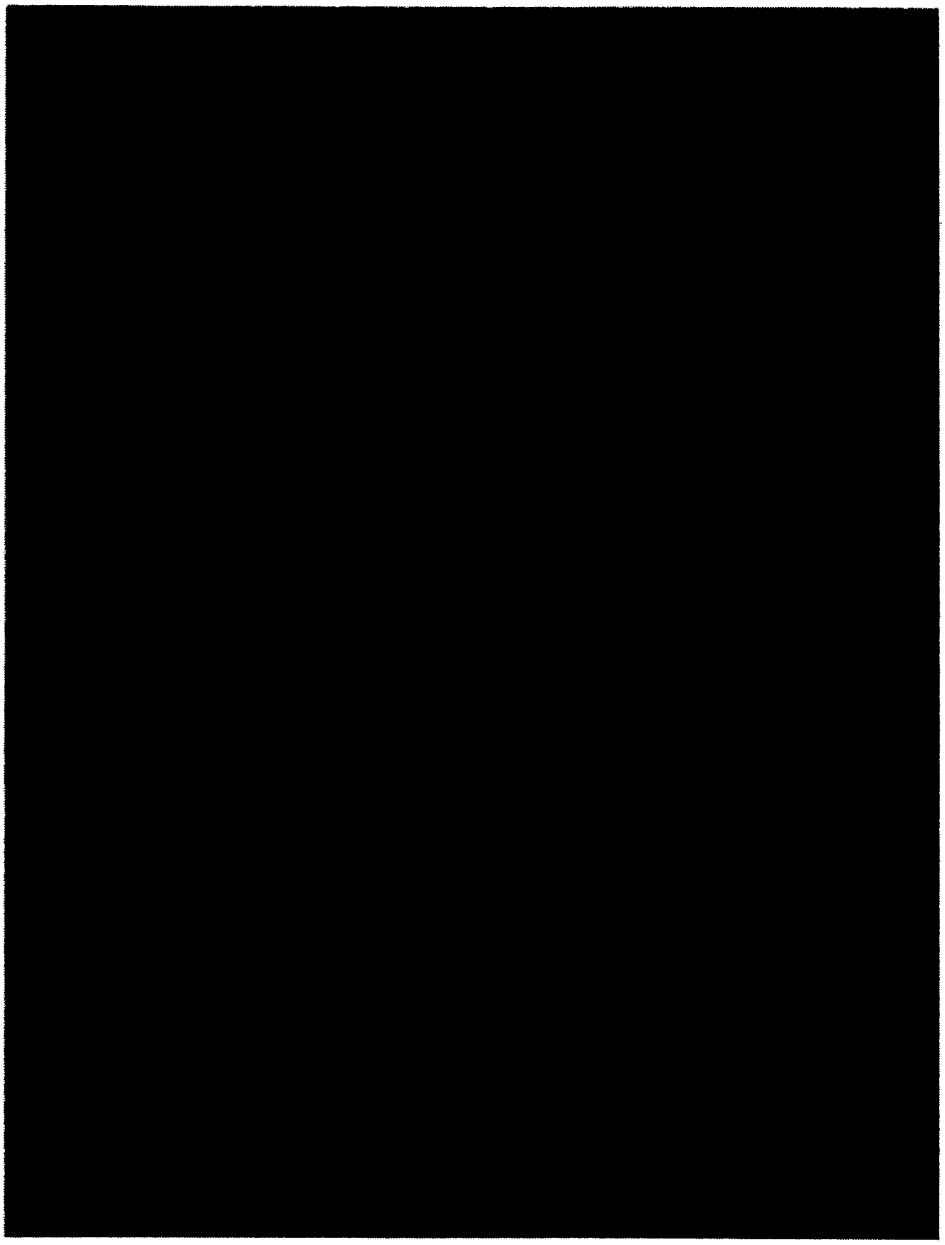
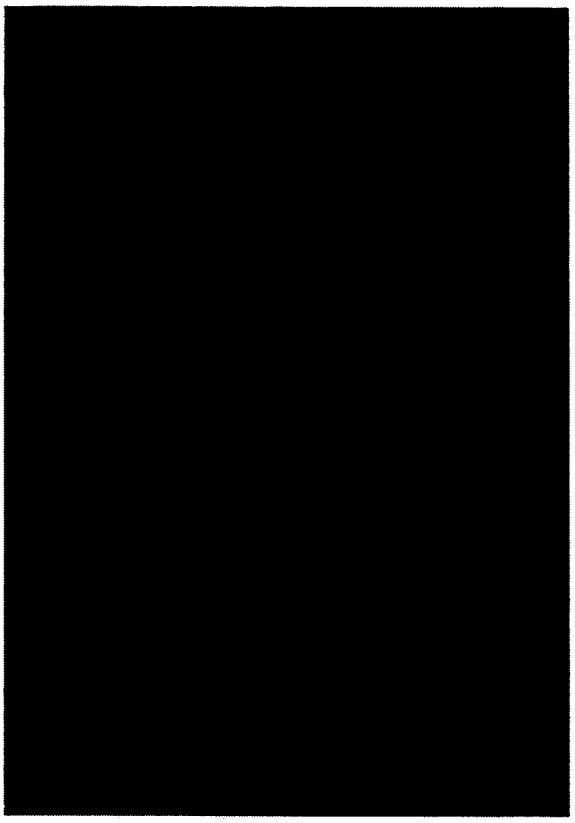


Fig. 35



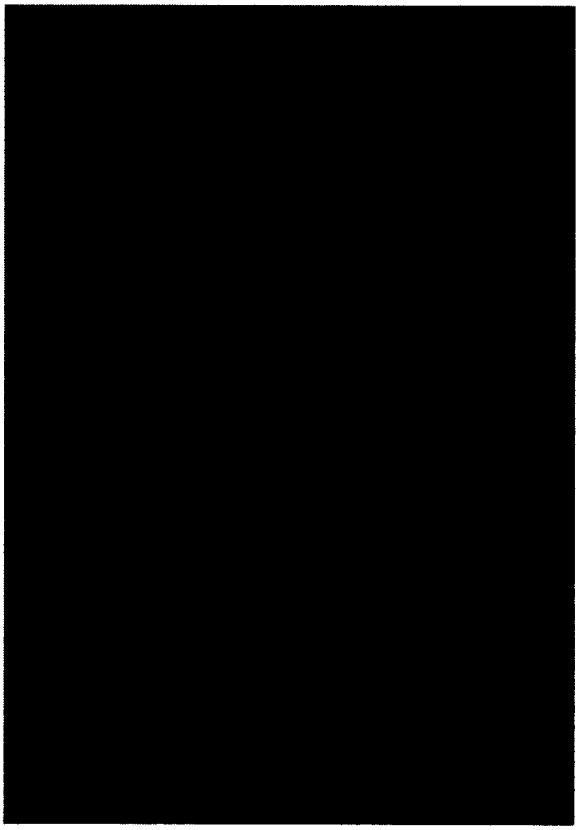
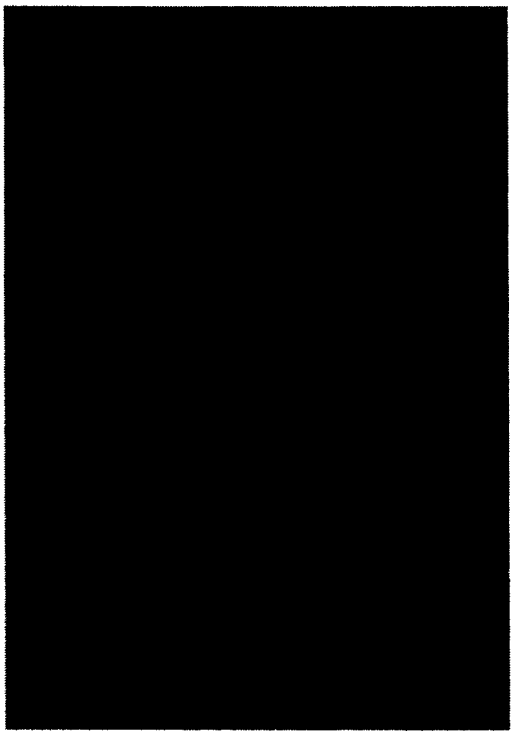


Fig. 36



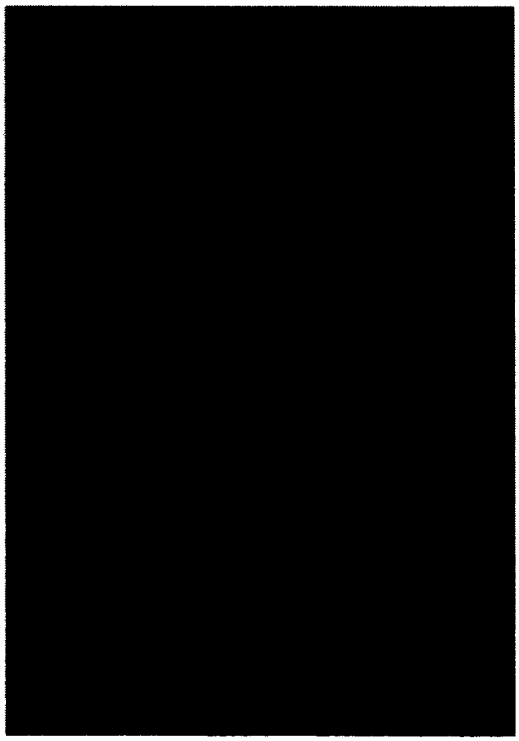


Fig. 37

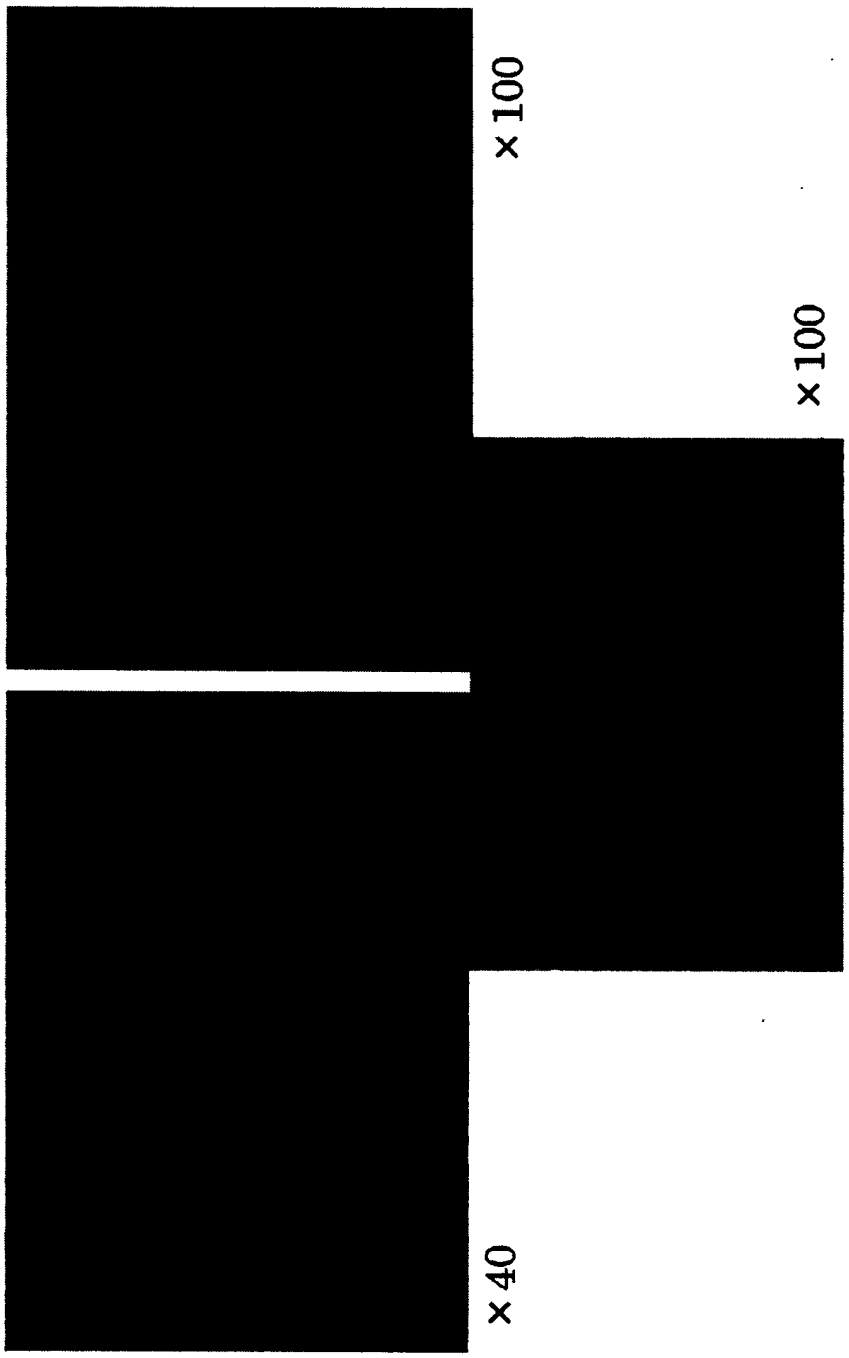


Fig. 38

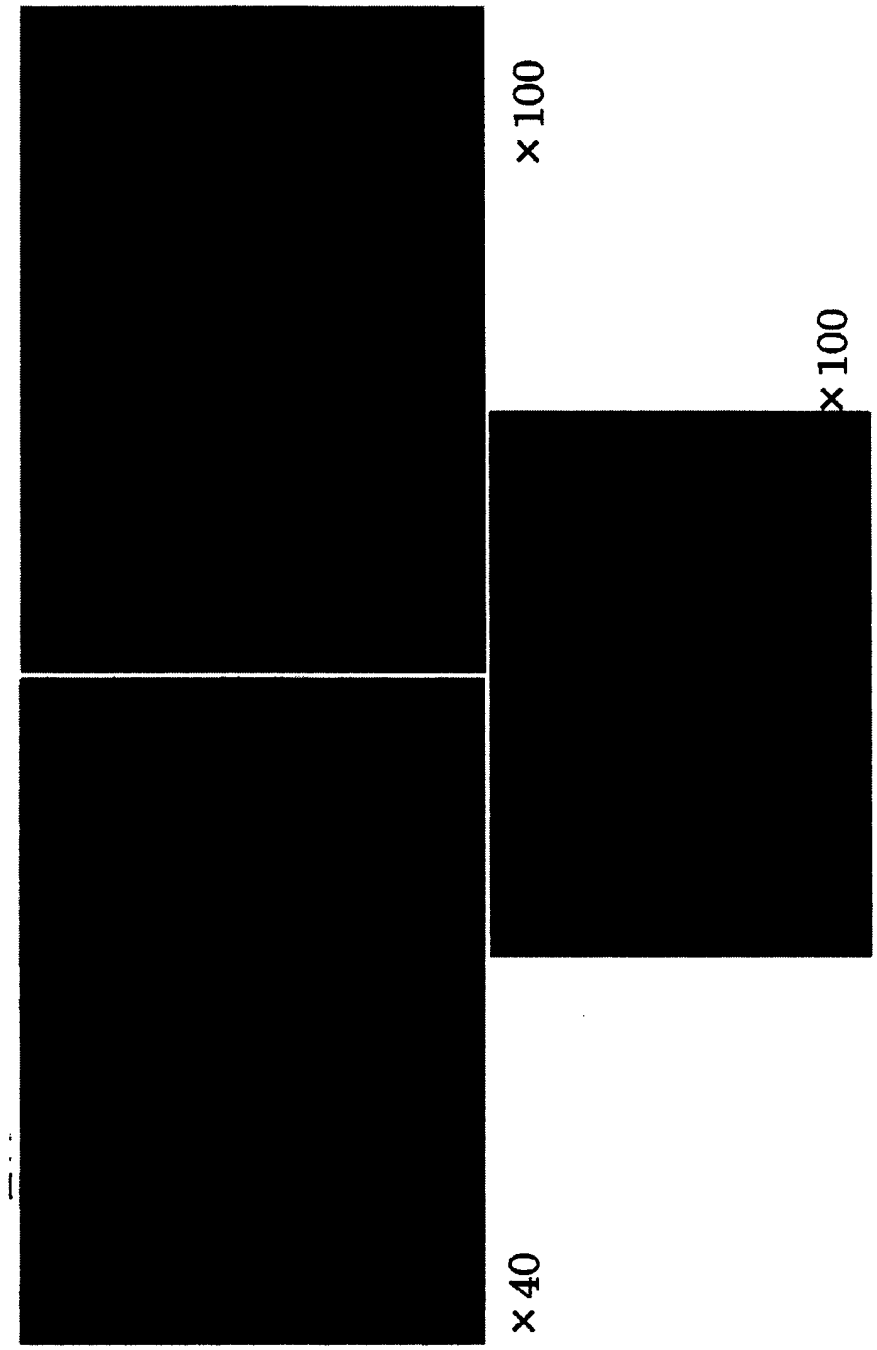


Fig. 39

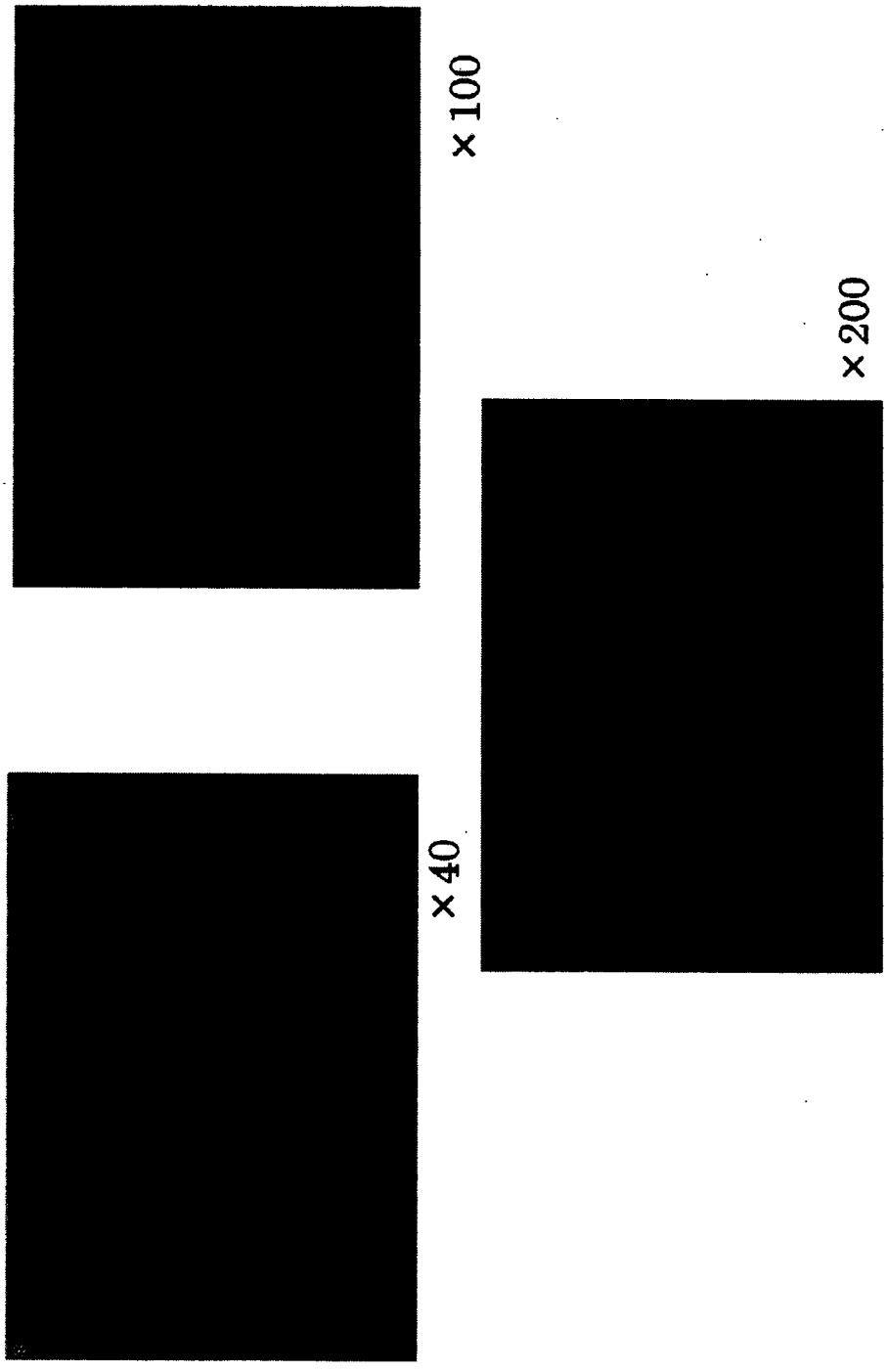
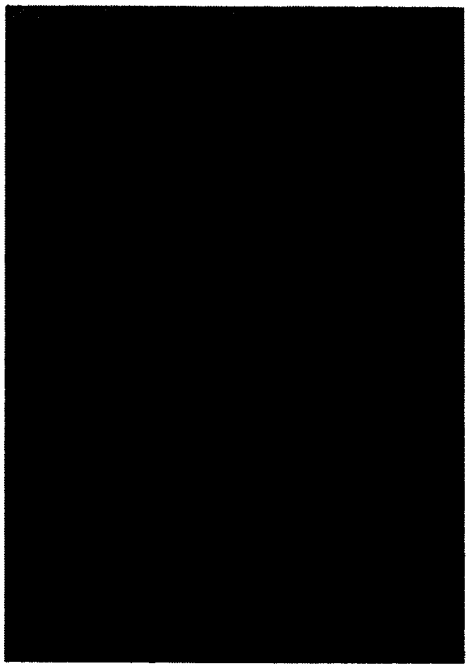


Fig. 40



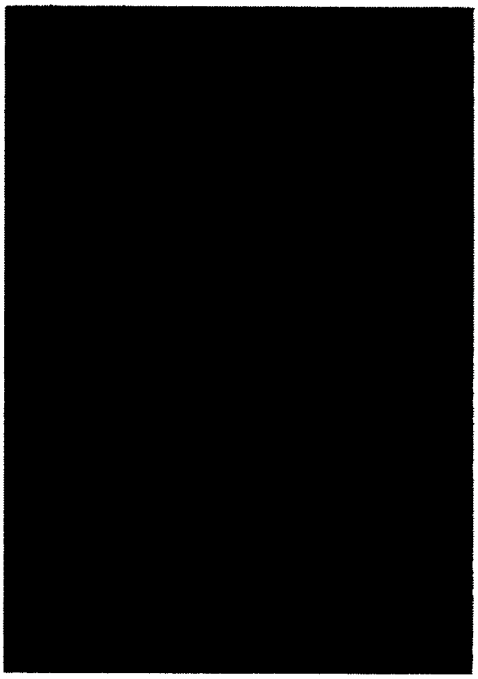


Fig. 41

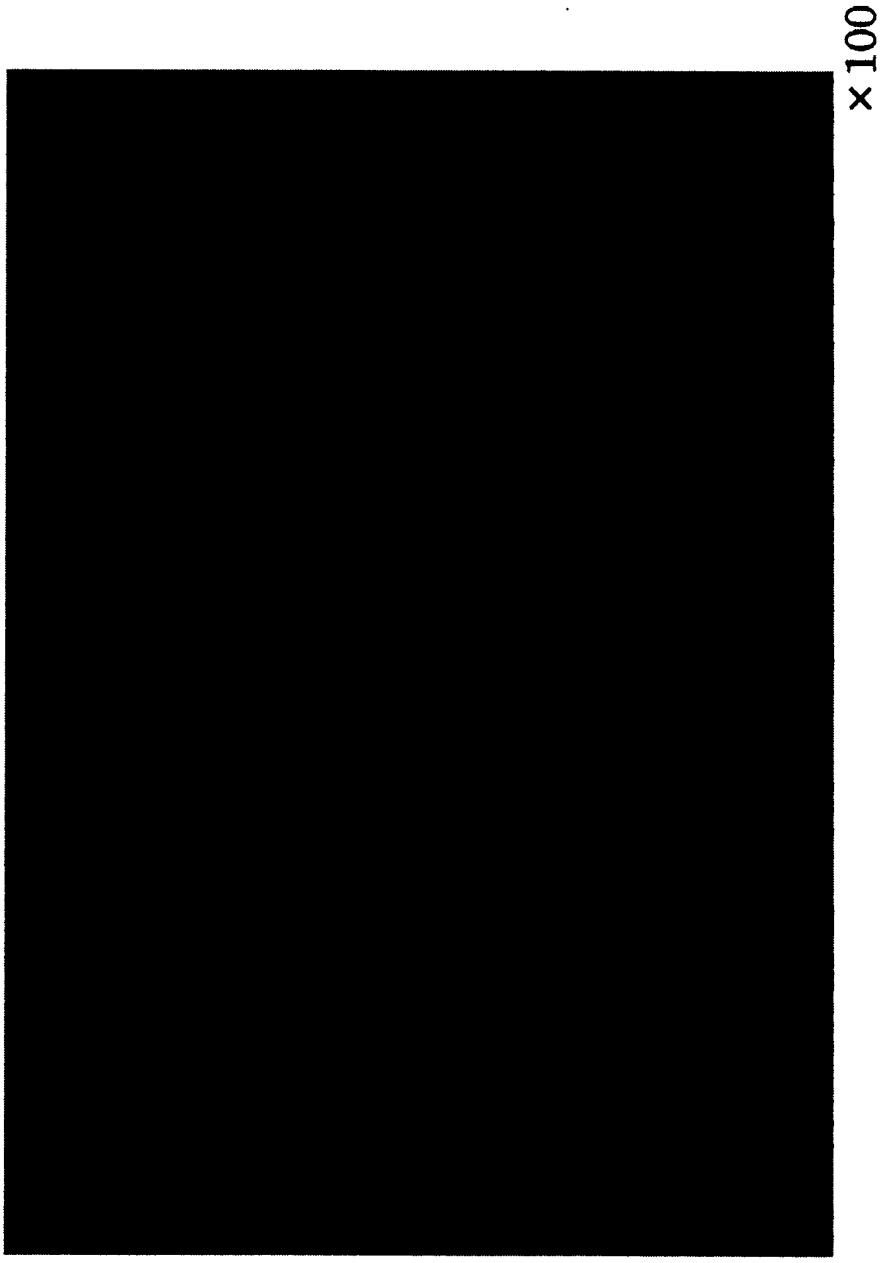
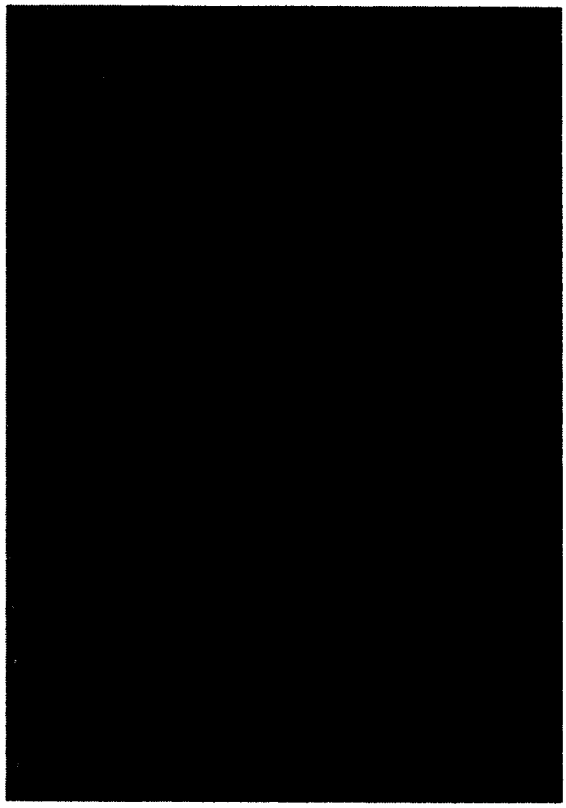


Fig. 42



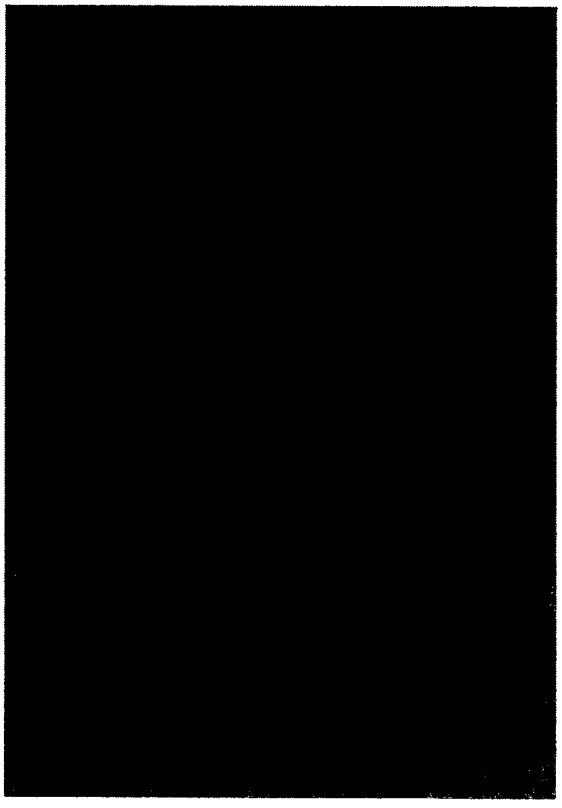


Fig. 43

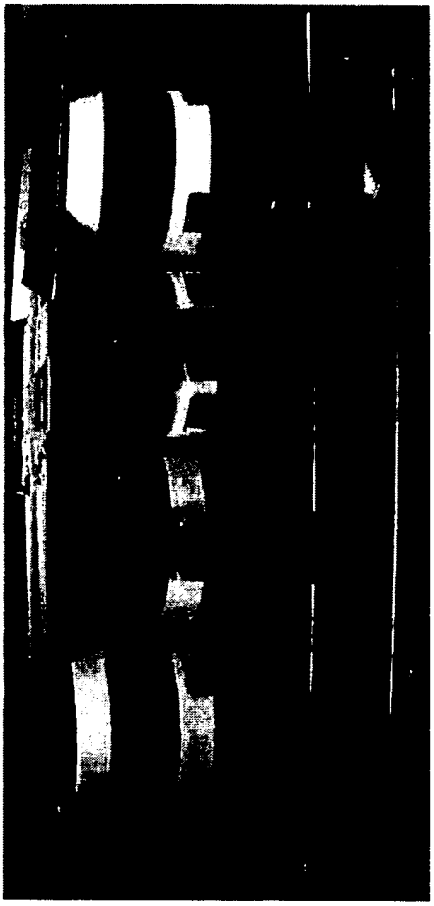


Fig. 44

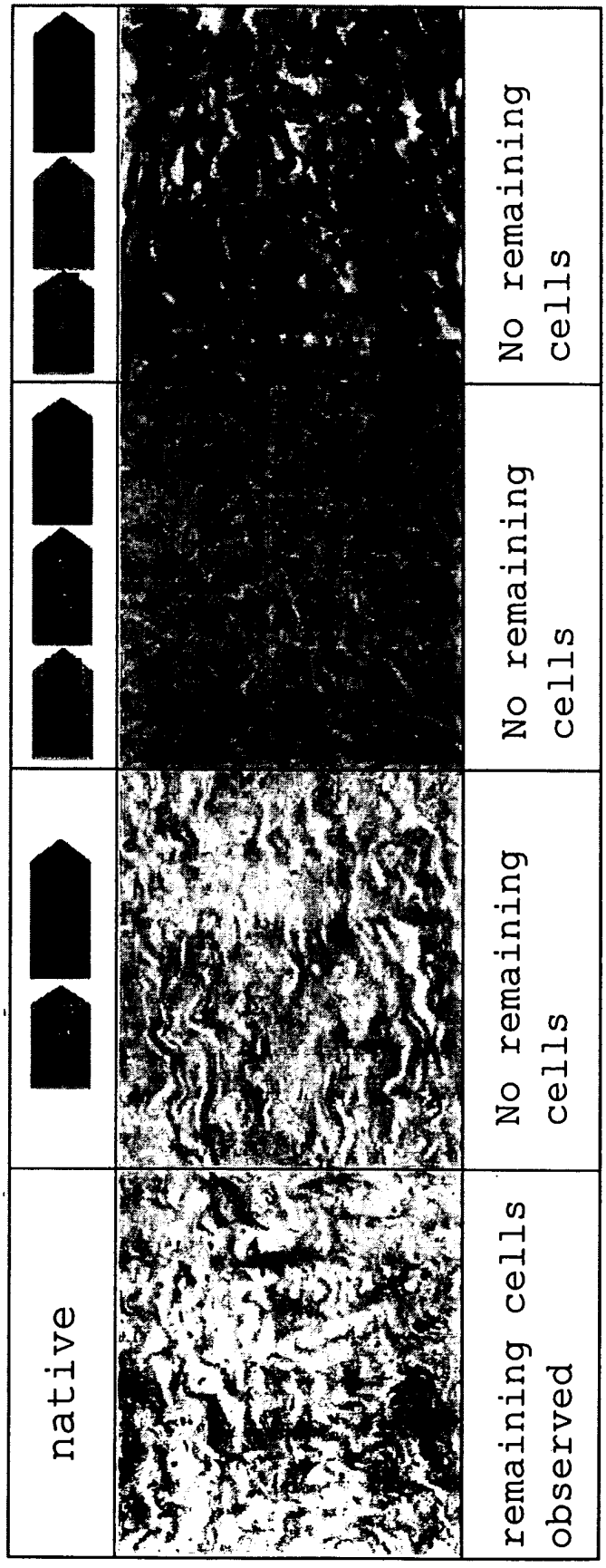

*HE staining, X200, gamma-irradiation: 15kGy
native
remaining cells observed
No remaining cells
No remaining cells
No remaining cells

Fig. 45A

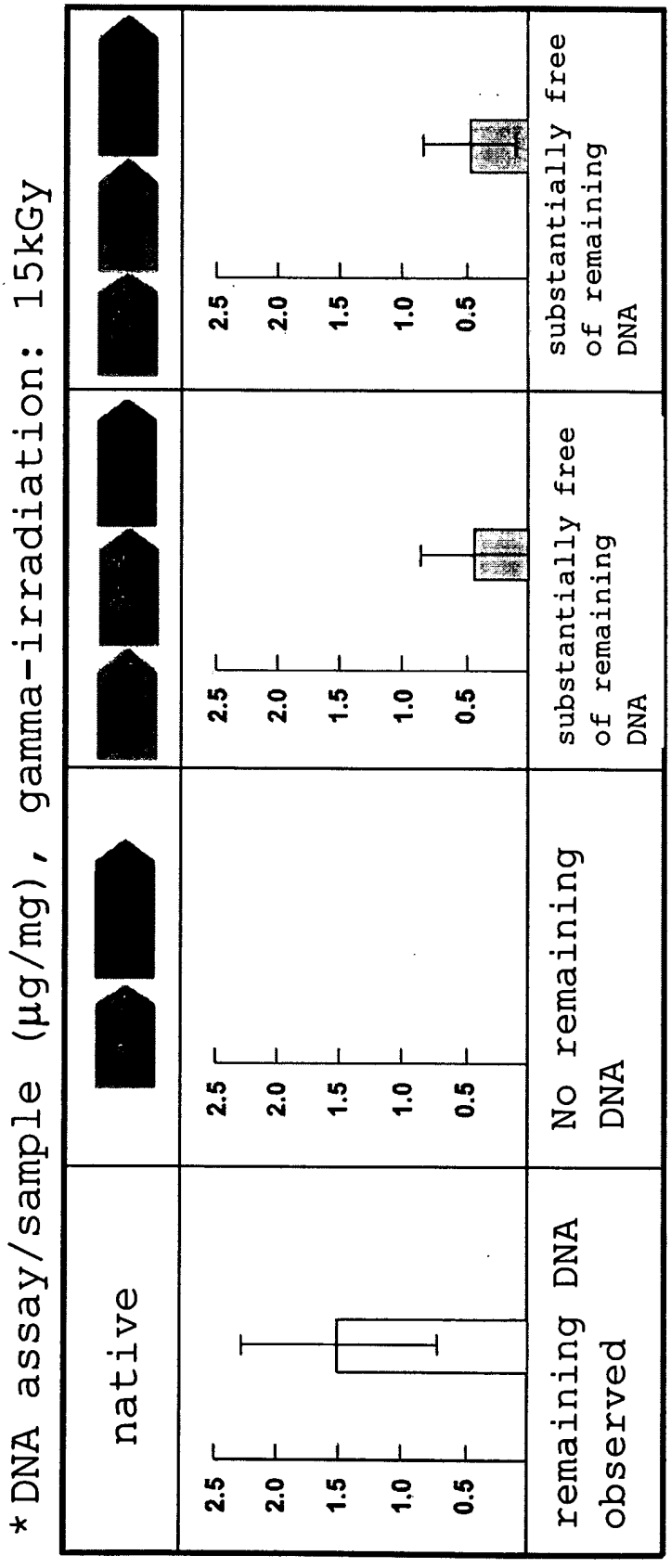

*DNA assay/sample (µg/mg), gamma-irradiation: 15kGy
native
2.5
2.0
1.5
1.0
0.5
remaining DNA observed
No remaining DNA
substantially free of remaining DNA
substantially free of remaining DNA

Fig. 45B

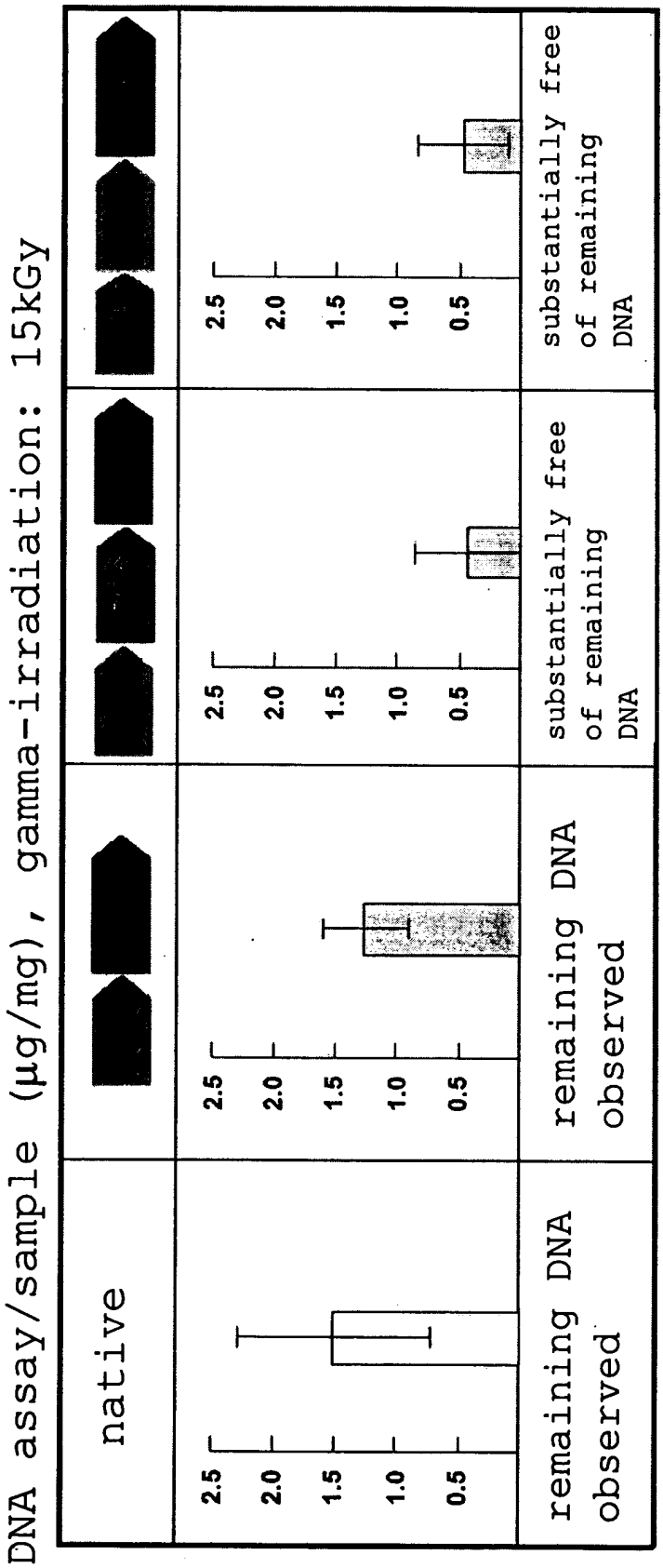

*DNA assay/sample (µg/mg), gamma-irradiation: 15kGy
native
2.5
2.0
1.5
1.0
0.5
remaining DNA observed
substantially free of remaining DNA

Fig. 46

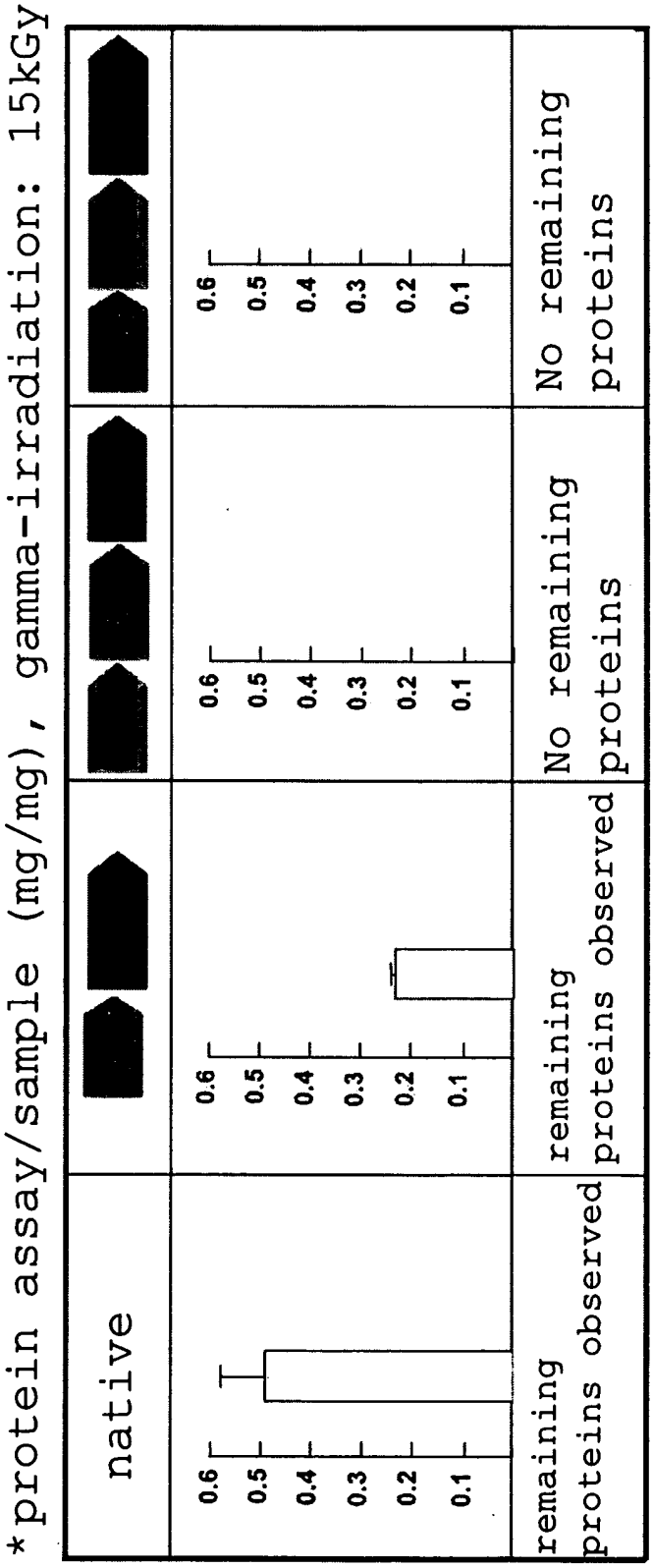

*protein assay/sample (mg/mg), gamma-irradiation: 15kGy
native
0.6
0.5
0.4
0.3
0.2
0.1
remaining proteins observed
No remaining proteins

Fig. 47

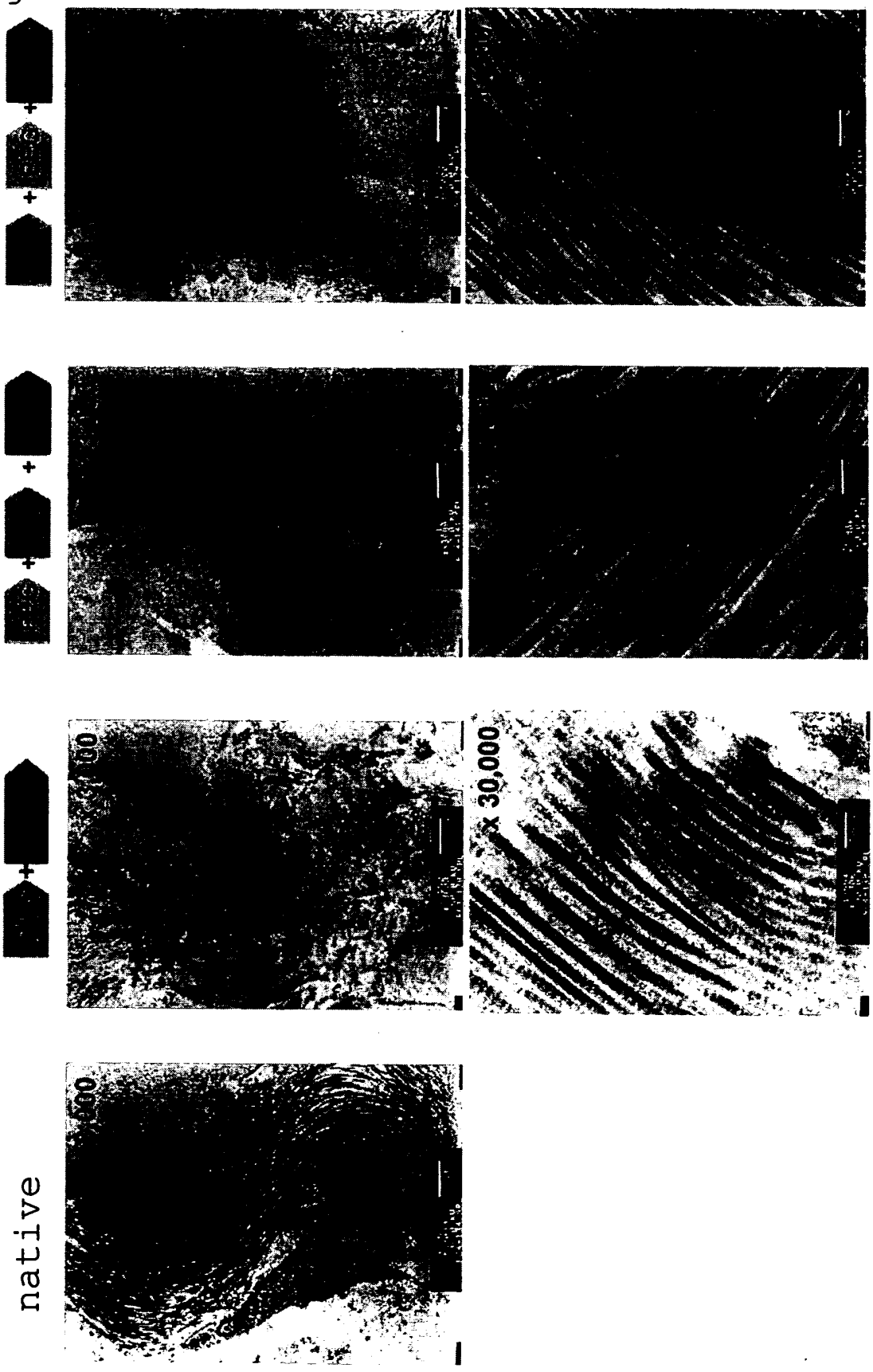


Fig. 48

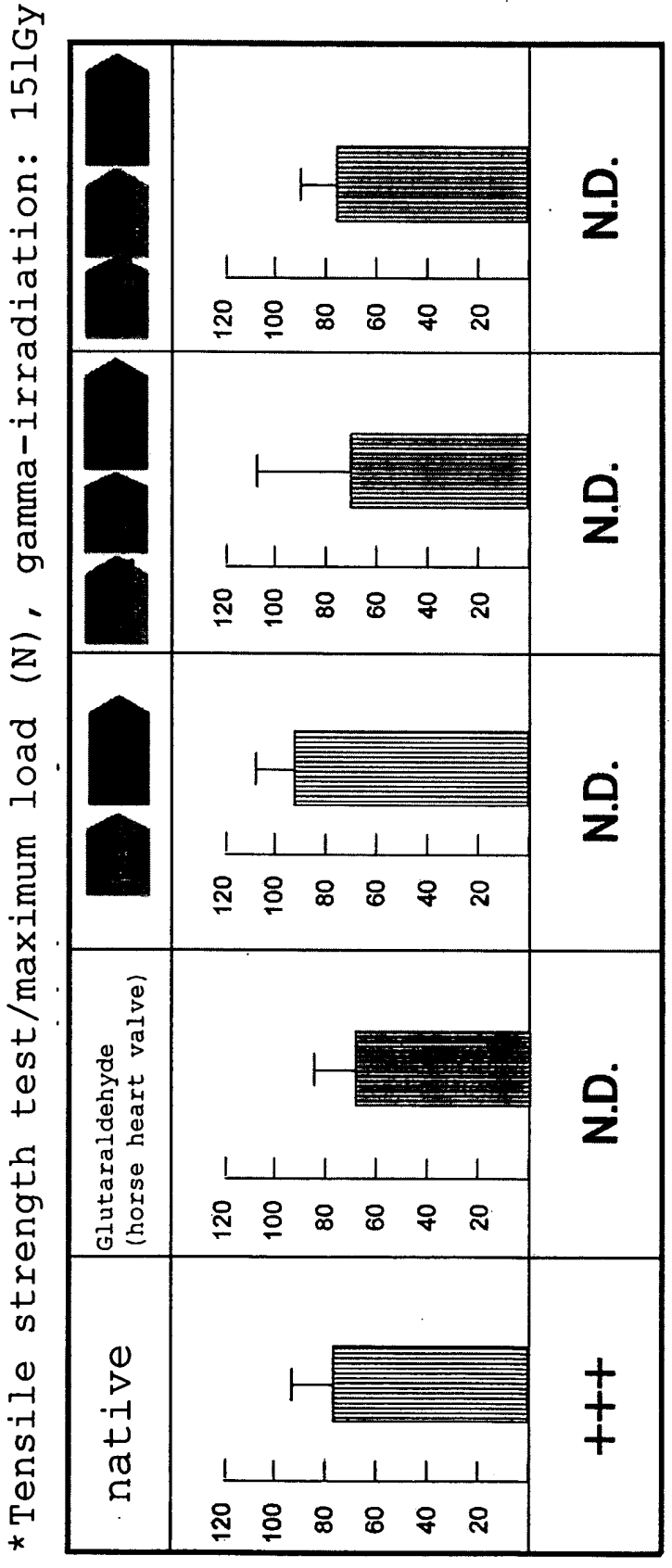

*Tensile strength test/maximum load (N), gamma-irradiation: 15lGy
native
Glutaraldehyde (horse heart valve)
120
100
80
60
40
20
+++
N.D.
N.D.
N.D.

Fig. 49

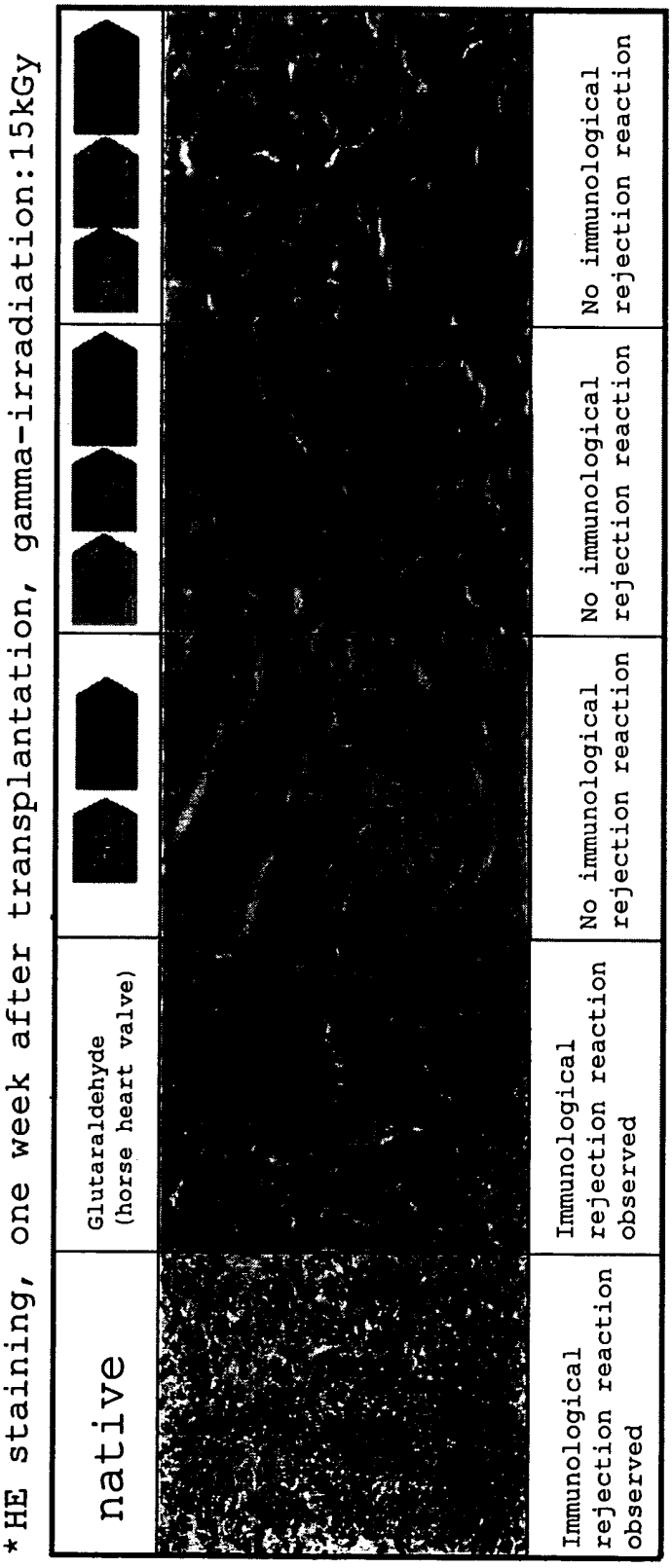

*HE staining, one week after transplantation, gamma-irradiation:15kGy
native
Glutaraldehyde (horse heart valve)
Immunological rejection reaction observed
Immunological rejection reaction observed
No immunological rejection reaction
No immunological rejection reaction
No immunological rejection reaction

Fig. 50

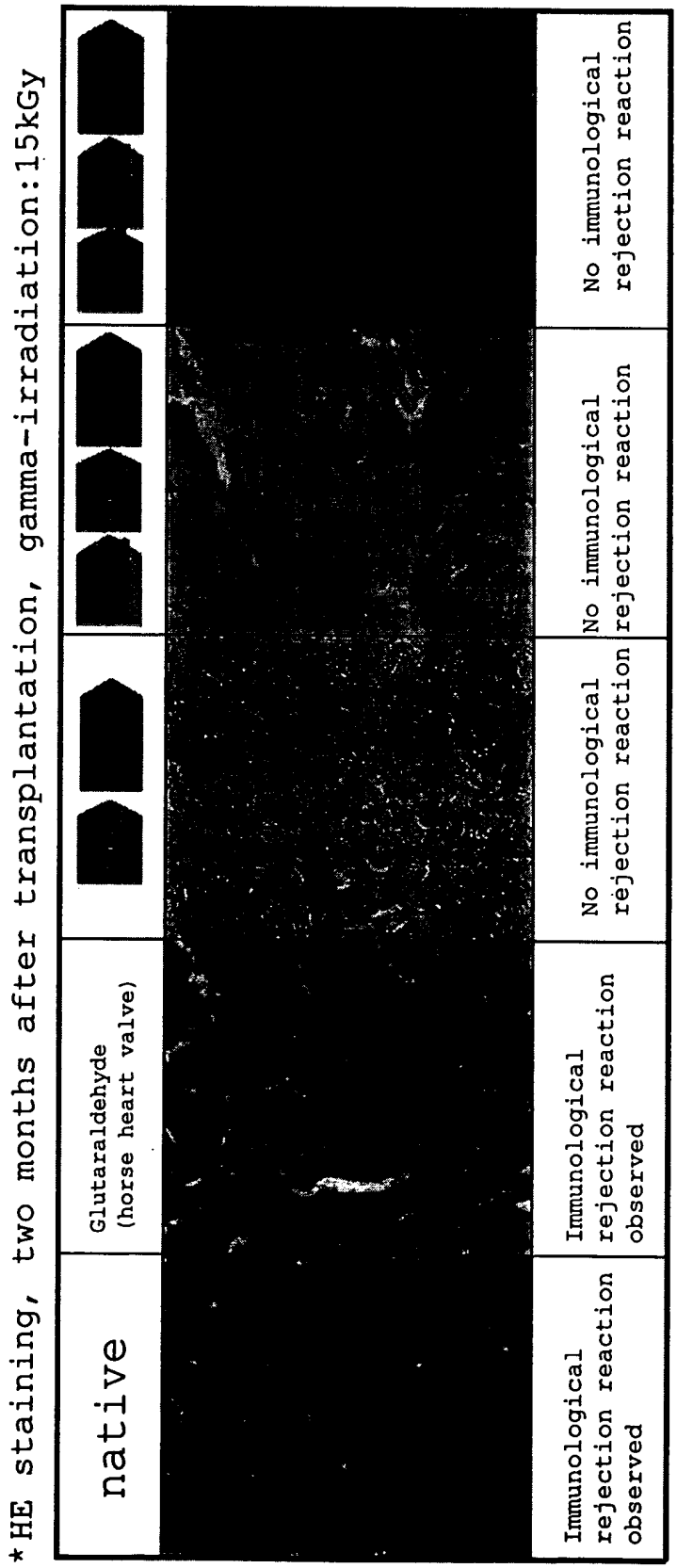

*HE staining, two months after transplantation, gamma-irradiation:15kGy
native
Glutaraldehyde (horse heart valve)
Immunological rejection reaction observed
Immunological rejection reaction observed
No immunological rejection reaction
No immunological rejection reaction
No immunological rejection reaction

Fig. 51

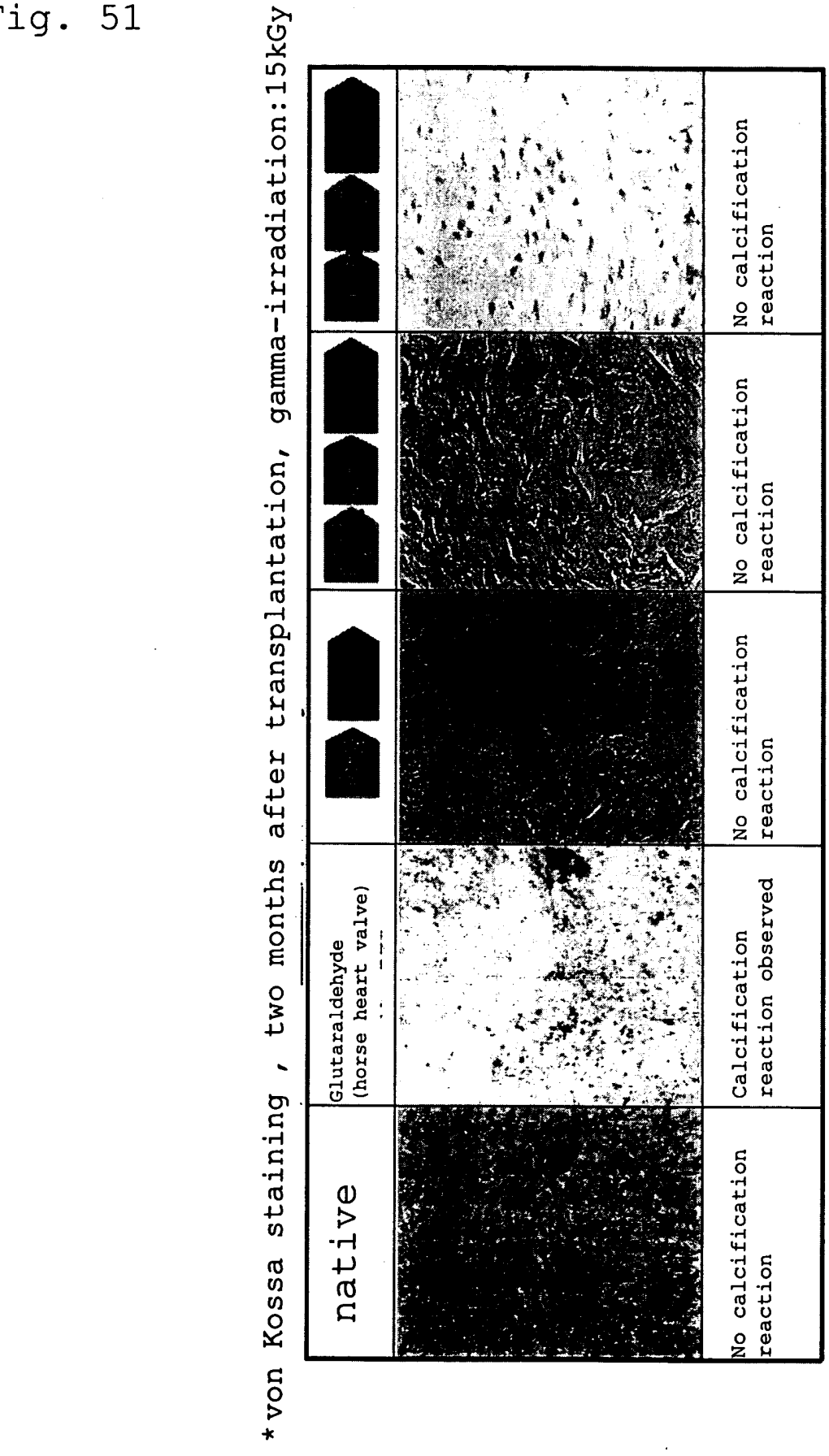

*von Kossa staining , two months after transplantation, gamma-irradiation:15kGy
native
Glutaraldehyde (horse heart valve)
No calcification reaction
Calcification reaction observed
No calcification reaction
No calcification reaction
No calcification reaction
No calcification reaction

Fig. 52

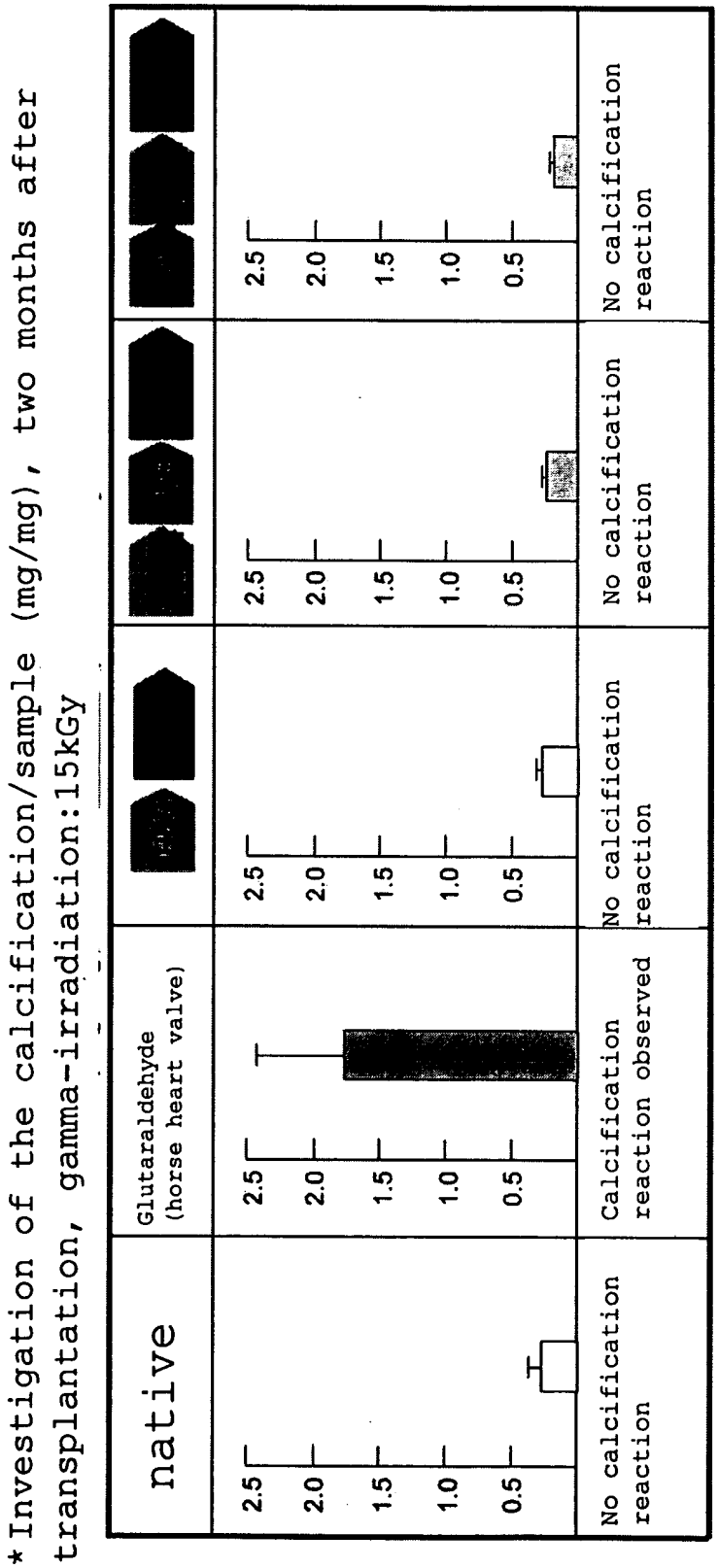

*Investigation of the calcification/sample (mg/mg), two months after transplantation, gamma-irradiation:15kGy
native
Glutaraldehyde (horse heart valve)
2.5
2.0
1.5
1.0
0.5
No calcification reaction
Calcification reaction observed
No calcification reaction
No calcification reaction
No calcification reaction
No calcification reaction

Fig. 53

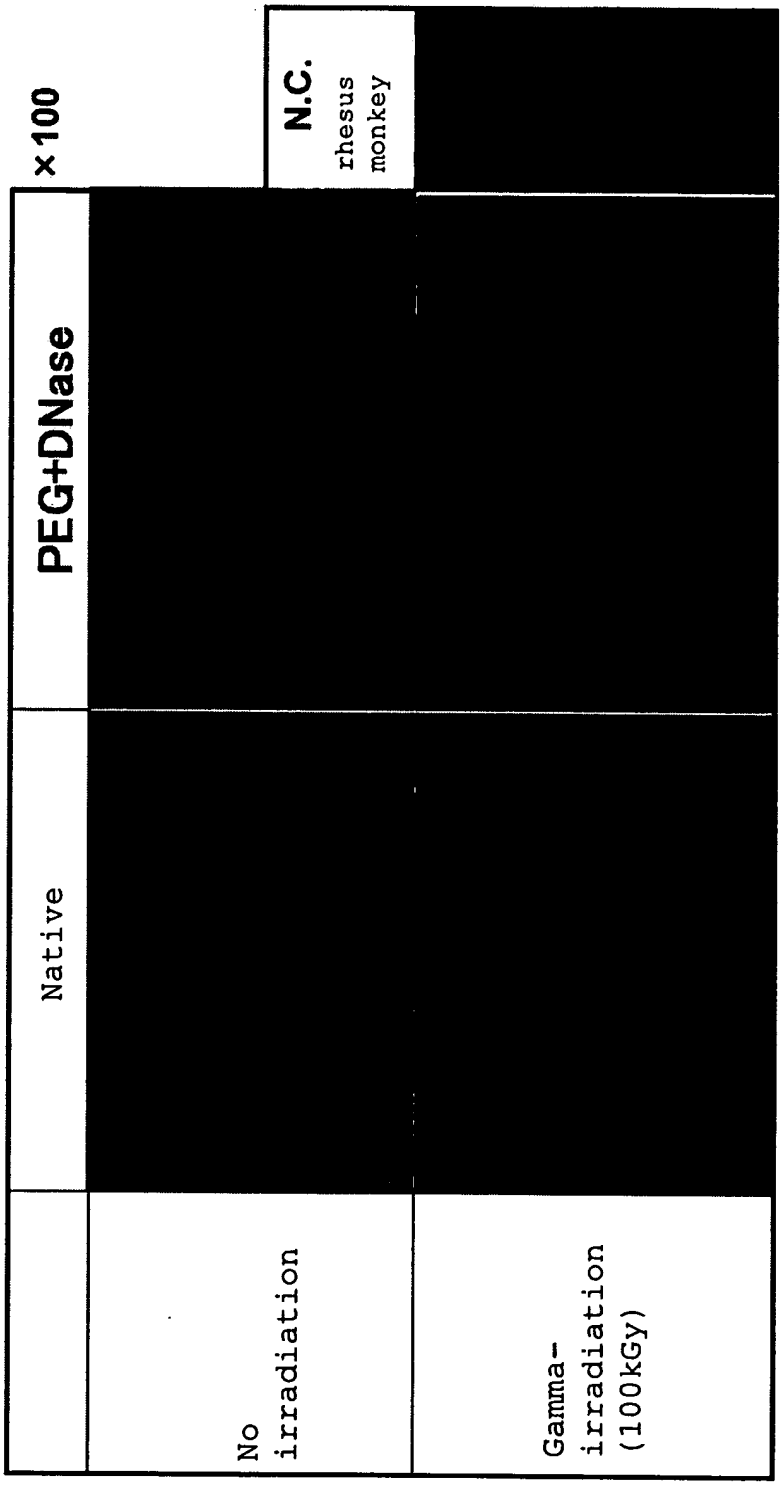

×100
PEG+DNase
Native
N.C.
rhesus monkey
No irradiation
Gamma-irradiation (100kGy)

Fig. 54

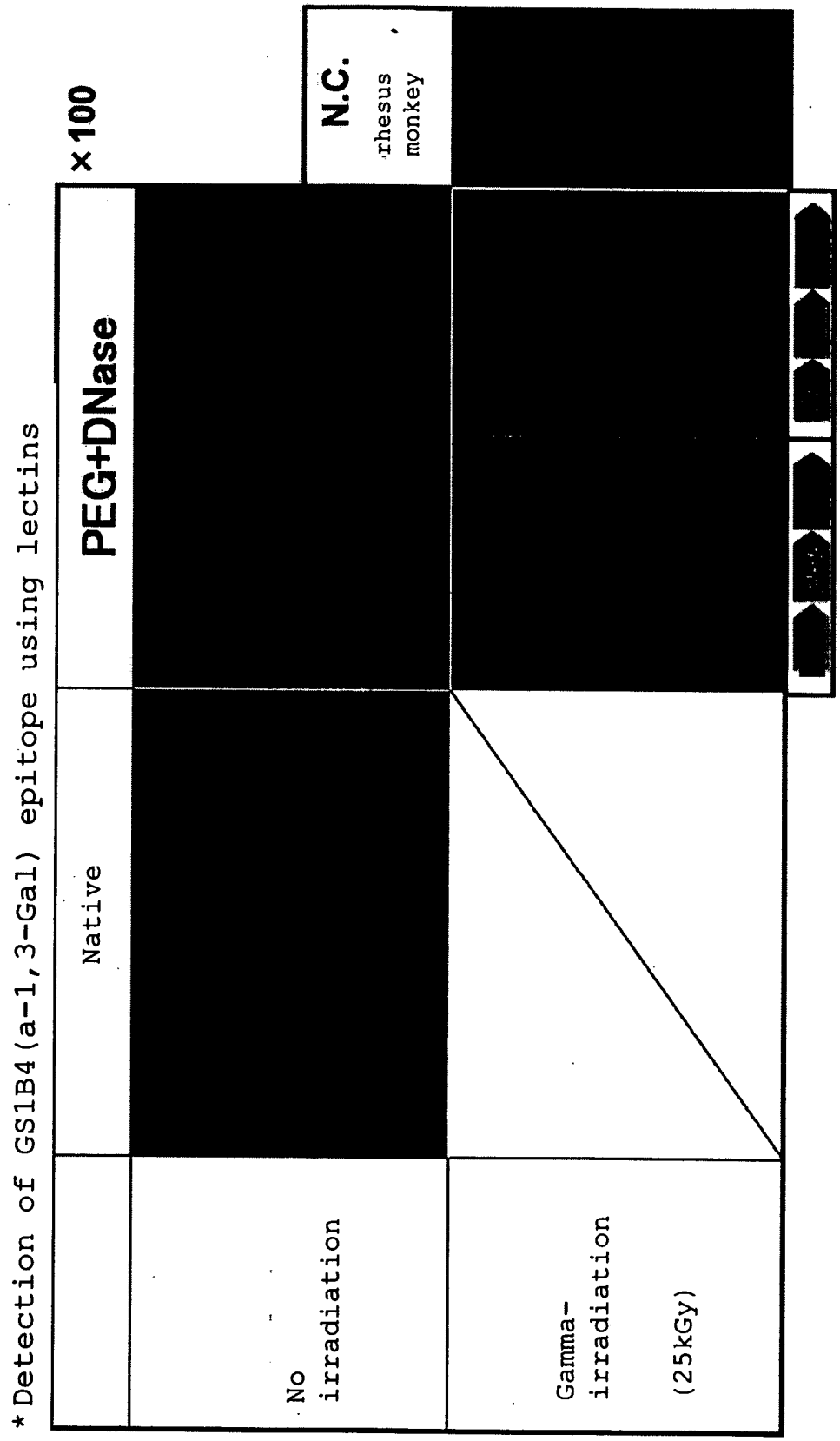

*Detection of GS1B4(a-1,3-Gal) epitope using lectins
Native
PEG+DNase
×100
N.C.
rhesus monkey
No irradiation
Gamma-irradiation
(25kGy)

Fig. 55

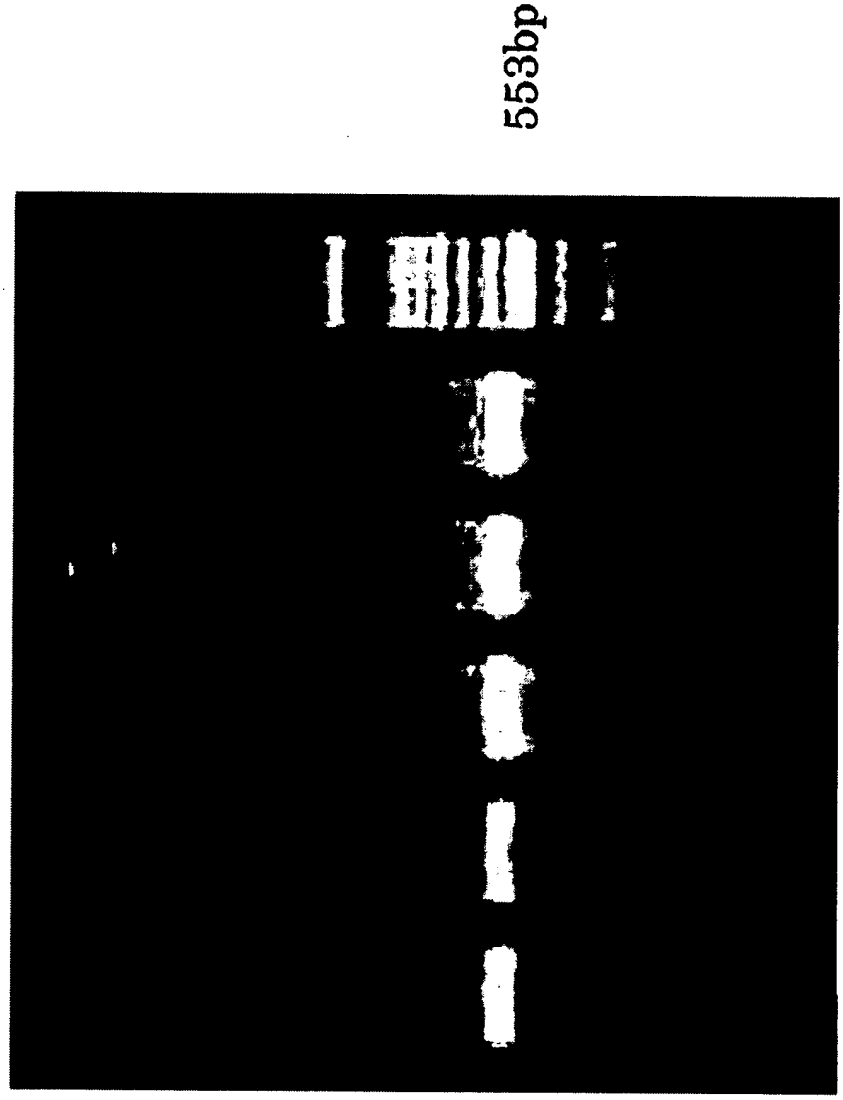


Fig. 56

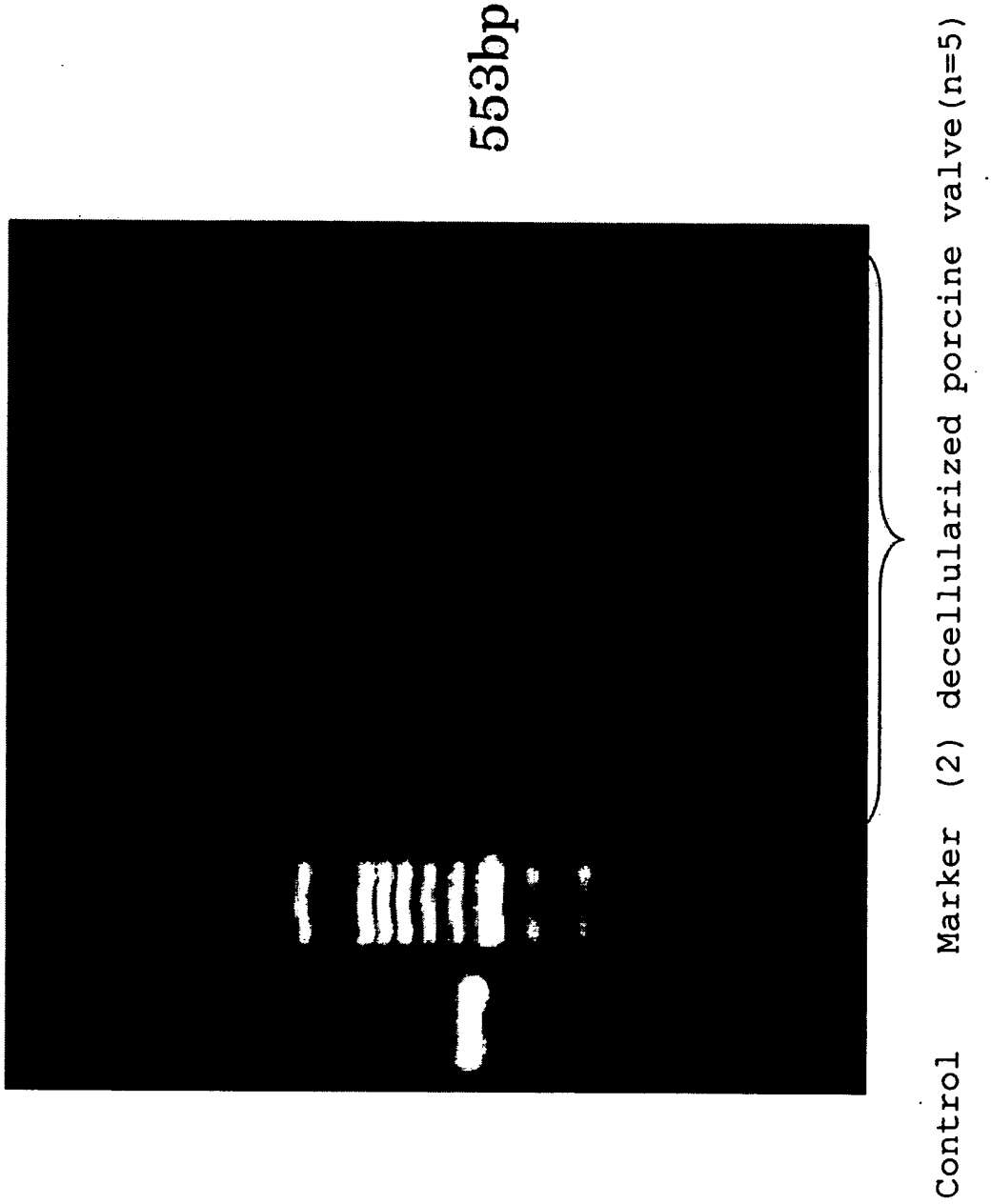
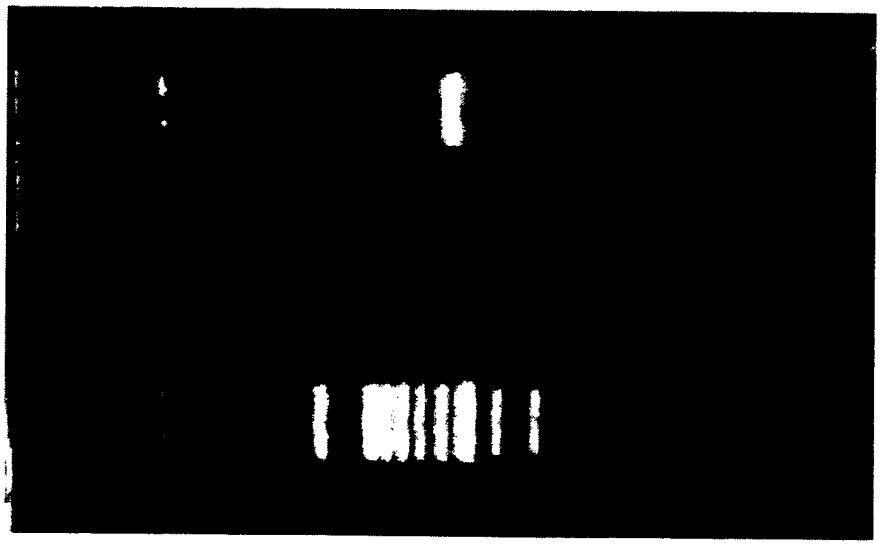


Fig. 57



(1) native porcine valves
(2) the decellularized porcine valves removed from the host thirty days after transplantation
(3) the decellularized porcine valves removed from the fifty-six days after transplantation

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